...st Engin.
Library
-S
-70

E. M. Baker

The Monthly Review of the AMERICAN ELECTROPLATERS' SOCIETY

CONTENTS

Editorial 255

Fulforth—Message to the A. E. S. Membership 257

Berry—Metallic Rectifiers and Motor-Generator Sets for Electroplating 259

ApRoberts—A Brief Discussion of Still Tank Pickling 271

Here and There 280

Research Committee Meeting at National Bureau of Standards 282

Branch News 288

Membership Report 312

Membership Campaign 313

Index to Advertisers 320

Buyers' Guide 324

Branch Directory 328

APRIL 1941

the problem:

- **Trouble With Explosions From Electro-Cleaner**
- **Contamination Of Plating Solutions From Dragging Cleaner Thru Plating Cycle**
- **Softening Of Rack Coverings Due To Attack By Wetting-Agent In Cleaner**
- **Heavy Silicate Deposit On Sides Of Cleaner Tank And On Steam Coils**

the answer:

CLEPO CATHANODIC CLEANERS

WETTING-AGENT FREE AND SILICATE FREE

FREDERICK GUMM CHEMICAL CO.
INCORPORATED
538 Forest St., Kearny, N. J.

Western Distributor
BELKE MFG. CO., 947 N. Cicero Ave.
Chicago, Ill.

CLEPO
CLEANING COMPOUNDS

The MONTHLY REVIEW

Published by the
AMERICAN ELECTROPLATERS' SOCIETY, INC.

Publication and Editorial Office
93 Oak Grove Ave.
Springfield, Massachusetts

VOL. XXVIII APRIL 1941 NO. 4

Readjustments

Offhand, this may not seem to be the proper time to talk of readjustments since it is not our most pressing problem today. Readjustments will be something to worry about after the Defense Program has been completed and World War II is over. However, it may be well to consider this problem now so that we can be prepared, when the time comes, to make the necessary changes with a minimum of hardship.

Today we are mainly concerned with the purchase and delivery of raw materials and turning them into finished products as fast as possible. Lack of foresight has caused serious interruption of production in some cases because of shortages in such materials as nickel and some of the plating salts. Let's think ahead a few years and consider the conditions that we will have to face. Foresight of this kind may prove to be the proverbial "Stitch in Time."

The production of metals, particularly the light metals, is being increased rapidly. Magnesium production, for instance, is being increased from 6,500 tons a year to 25,000 tons a year. The production of aluminum is being stepped up to 800 million pounds a year, with a competitive source coming in to have an additional production capacity of 80 million pounds a year. Due to the shortage of metals or slow deliveries, many concerns are being forced to use plastics as a substitute for various metals which they have used heretofore. Mandatory priorities on materials necessary to the requirements of the Defense Program, plus other less serious shortages where mandatory priorities have not yet been exercised necessitate substitutions. Many of these substitutions will be found superior or cheaper and will permanently replace materials now being used. These examples include three materials which do not require plating in order to increase their durability or "customer appeal." It is true that

aluminum is plated but it is not a common operation. It is also true that plastics are plated but, again, it is something not commonly done.

When the Defense Program is completed we are going to have the competition of the enormously increased production of these materials and there will be a mad scramble for the available business. Aluminum, magnesium and plastics will compete with brass, copper and steel, the old stand-bys, which we have plated for years. This same condition would probably have occurred normally without the present emergency, but it would have taken place gradually over a period of years rather than within a period of a relatively short time.

While we do not need to be concerned with plating going out as an obsolete art, it is obvious that plating is going to change radically within the next few years and it will be necessary for everyone connected with the industry to keep up to date on the proper methods of plating and finishing these substitutes.

Let's look at some of the effects of these changes on the Plating Industry. The increased production of plastics, of course, means an increased number of molds and increased production from individual molds. It has been pointed out in several papers presented before the American Electroplaters' Society recently that the die life and the surface of the finished molded part are both improved by chromium plating of dies. Aluminum and plastics are both plated by special techniques which are jobs for the plater. Aluminum and magnesium are both given special corrosion resisting coatings by chemical and electrochemical processes. These normally are applied in the Plating Room. Thus, the mere fact that there will be changes in methods indicates that the plater will be called upon to apply new finishes, and will therefore have to face a change in trend rather than a decrease in the requirements from his profession.

As has been demonstrated for the past thirty years, the best clearing house for information on new methods of finishing and the solving of individual problems in plating is through membership in the American Electroplaters' Society. The officers of the Society, and particularly the Editor of the MONTHLY REVIEW, recognize the situation and are making every effort to present the latest data available on new products. The paper in the March REVIEW on the plating of bearings with indium is one example of how the members are being informed of the latest in plating. The President of the American Electroplaters' Society recently attended a meeting in Washington to place the Metallic Nickel situation from the platers' standpoint before the O. P. M. Committee. These are some of the things that the American Electroplaters' Society is doing for the Plating Industry.

Therefore, with a view to presenting the benefits and services

of the American Electroplaters' Society to *all* people who can and should use them, we strongly appeal to our members to search out all eligible candidates connected with the Plating Industry and present the facts to them. In this way, and in this way only, can we raise our standards to a point where the Society can best serve the Nation when the Nation needs us most.

ELLSWORTH T. CANDEE, *First Vice-President.*

AN OPEN LETTER TO THE A. E. S. MEMBERSHIP AND USERS OF METALS FOR ELECTRO-DEPOSITION

As representing the majority of electroplaters in his position as nominal head of the American Electroplaters' Society, your president spent two days in Washington, D. C., in almost constant contact with various members of the staff of the Office of Production Management, in an endeavor to discover as much as possible of the actual deposition metals situation as related to our industry's immediate future.

In the first place, it should be stated that the men in charge of various departments of this work all have an extremely cooperative outlook, and are giving freely of their time in an endeavor to understand and solve the difficult problem confronting the country. Their primary purpose is of course to see that all defense industries are adequately, but not overly, supplied with the materials necessary to carry on the defense program. Their secondary aim is to distribute, as uniformly as possible, whatever remainder of such raw materials may be left for non-essential industries, so that a minimum number of workers will be adversely affected. Such distribution is at present based on the amounts purchased by you in 1940.

The whole idea of priority allocation has been so recently put under control, that insufficient time has elapsed to allow the O. P. M. even to secure all the necessary data for determining a course of action; so that everyone should attempt to appreciate their enormous problem, while the utmost assistance they can be given toward a rapid solution thereof will be to cease individual efforts to secure materials for non-essential industries from them by personal solicitation.

The O. P. M. is constantly conferring with manufacturers of raw materials supplied to our trade, and just as much consideration will be given your request coming through your local supplier or manufacturer as though you had made a personal visit. Actually, as such direct request by you would be checked with your supplier previous to action anyway, such additional

solicitation only increases the resulting confusion and duplication of effort. It can be readily seen that ordering from more than one supplier must temporarily cease, unless your orders have been placed through two or more suppliers in 1940, as such requests only embarrass the new source of supply, who must refuse.

The amount of materials purchased by you in 1940 is known to the O. P. M., and any allocation of those under control in 1941 will be securable through the same source to whatever extent the industry as a whole is allotted such materials from month to month; while you may be assured of receiving your proper proportional share without recourse to any other than your usual suppliers.

It is too early to make any forecast as to the final outlook even by the experts gathered in Washington, but everyone should do his utmost to reduce temporarily the consumption of essential metals, especially nickel, in his business by all methods possible, being careful not to attempt to go from one coating to another, which may be in worse condition of supply by the time the change is made; and it is for this reason we should either sit tight for the next two or three weeks, or move very carefully after full consultation with the suppliers.

As soon as it is possible to secure a reasonable future picture, you may be assured that it will be transmitted promptly, as the O. P. M. has recognized the A. E. S. as representing a majority of the users of electro-deposition metals for proper contact purposes and frequent touch will be maintained with them. Whenever information becomes available which would indicate a change in methods or metals, it will be distributed with proper technical and educational suggestions for its fulfillment.

FREDERICK FULFORTH

NO PREPRINTS OF CONVENTION PAPERS THIS YEAR

Owing to the difficulty in receiving papers from the various authors due no doubt to the unusual conditions which confront the industrial world at present, the Boston Convention Committee has decided not to attempt the Publishing of Preprints at this year's Convention.

1939-1940 COPIES OF THE REVIEW WANTED

We have had many requests for the February 1939 and December 1940 issues of the REVIEW. Our supply is exhausted. If any of our members have extra copies, please mail them to The Editor, 93 Oak Grove Avenue, Springfield, Mass.

Metallic Rectifiers *and* Motor-Generator Sets *for* Electroplating

By GORDON J. BERRY
The Electric Products Co.
Read at Chicago Annual Meeting
January 25, 1941
Discussed by *I. R. SMITH*
Westinghouse Electric & Mfg. Co.

THE metallic type of rectifier is not a radical and new development as a source of low voltage, direct current power — it has been tried and tested over a period of at least fourteen years. When these rectifiers were originally introduced, the inherent reduction of noise and weight was an apparent advantage for such services as charging telephone batteries and operating motion picture projection machines. However, despite certain fundamental advantages for these services, the rectifier has not supplanted the motor-generator set except in very small capacities where the unit cost is a minimum.

The data used as the basis for this treatise have been drawn from every available source — from research laboratory records, from the manufacturers of rectifiers and motor-generators, from actual field experience with both types of equipment, from the available published articles on this subject, as well as from the reports of our own research department. All data have been carefully checked to insure a fair and representative comparison.

For electroplating service the most favorable comparisons have come from England. However, it is particularly interesting to note that the published information establishes comparisons of the rectifier with generators on which the efficiency is 50% maximum, and they even say "It is quite impossible to run a motor-generator at full load for an unlimited time." Needless to say, these comparisons are of no value in this country where the comparative motor-generator efficiency would be better than 75%. The ability of modern motor-generators to carry heavy overloads continuously and safely needs no further comment.

A detailed study of the comparative performance of the rectifier and the motor-generator must be made under specific headings which will cover those characteristics of plating equipment which the average user will wish to consider carefully in evaluating the merits of these alternative sources of power. These headings would include such factors as efficiency, voltage regulation,

maintenance costs, effects of age, power factor, and such other features as are brought out incidentally under these headings, although no order of importance is inferred by the above list. A detailed analysis of each of these factors follows.

Efficiency

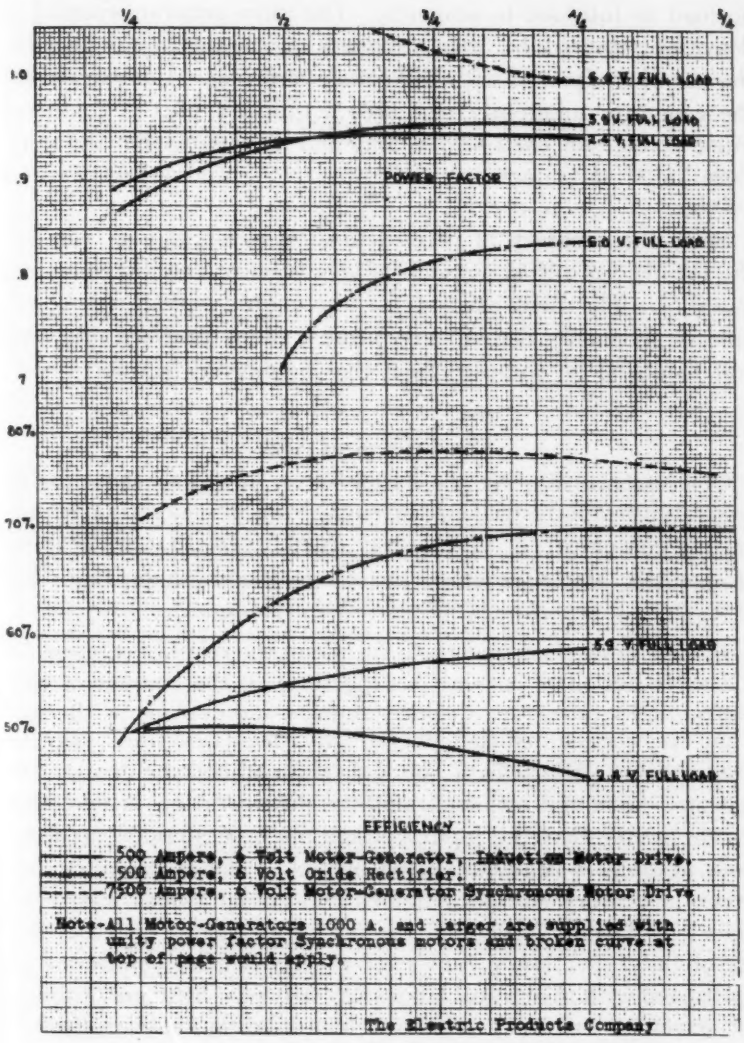
The daily operating costs of the converting unit are determined primarily by the efficiency of the apparatus in reducing the high voltage alternating current supply to low voltage direct current. An illustration of the efficiency of both the rectifier and the motor-generator is shown on slide curve No. 426. The 500 ampere rating was selected for use here as this is the capacity most generally described in sales bulletins on the rectifiers.

It is well to bear in mind that a comparison of electrolytic equipment of this capacity presents the rectifier in the most favorable light. It is well known that the efficiency of the rectifier does not increase in the larger sized equipment as does that of the motor-generator. A two or three percent improvement in efficiency from the smallest to the largest unit is the most to be expected. No increase of efficiency can be obtained for the reason that the losses in the rectifier are fixed by mechanical limitations of plate size, contact pressure, and volume of ventilation. As a verification, the efficiency of a 3000 ampere, 6 volt rectifier showed exactly the same full load efficiency of 55.9 percent as a 500 ampere unit.

When these rectifier efficiencies are compared with those of a standard 7500 ampere motor-generator, such as is more representative of the usual plating requirements, we find the motor-generator efficiency to be more than 30% higher than that of the rectifier. The comparison is shown on the slide. Intermediate motor-generator efficiency ratings would fall between the limits represented by the curves for the 500 and the 7500 ampere units. It is also particularly interesting to note the characteristic reduction of rectifier efficiency on light loads, contrary to the claims of sales literature.

Voltage Regulation and Control

The maintenance of uniform ampere densities is entirely dependent on maintaining constant voltage at all times and under all changing conditions of load. Constant voltage of the genera-



tor unit has therefore become a vital necessity for modern efficient plating processes.

Slide curve No. 427 shows the effect of load change on generated voltage for both the rectifier and the motor-generator set. The results are startling, with the rectifier voltage varying as much as 25% at rated voltage and almost 60% at 2/3 rated voltage from

no load to full load in amperes. The more accurate control of densities required by many modern processes would prohibit the use of equipment with this much variation. Comparatively the generator inherently regulates within 3% plus or minus of rated voltage on fixed field setting and likewise within the same close limits at voltage values between 75% and 110% of rated voltage.

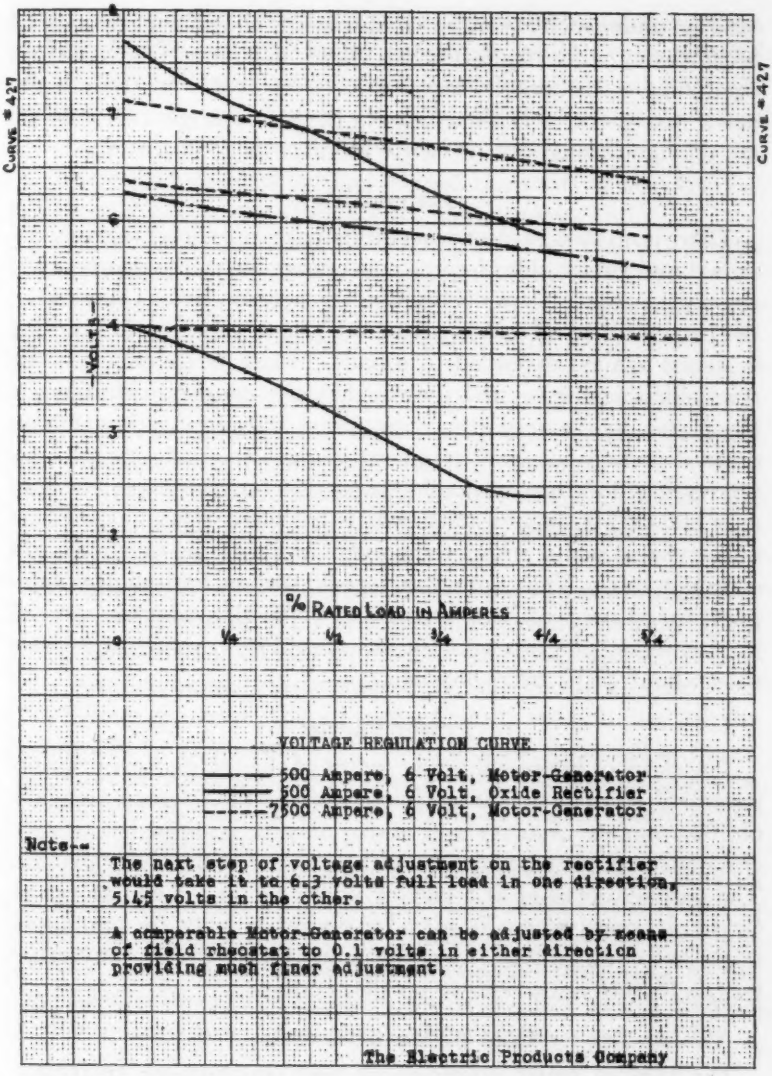
Since the accuracy of plate deposit is dependent on voltage, the facility for adjustment of voltage in very fine increments is essential. The field rheostat of the motor-generator set will provide as many as five intermediate steps between the half volt values to be obtained from the commercial rectifier.

The Effects of Age

Obsolescence may be the major factor affecting useful life in many types of industrial equipment but not in generating or converting equipment, of which many users expect 20 years or more of operating life. Therefore, the effects of aging upon this class of equipment is a subject of concern to the user.

In view of the fact that the principle of the rectifier is based on the valve action of current passing through the contact of two plates under pressure, definite changes take place with age. That the rectifier efficiency gradually decreases from year to year and the variations of voltage with load become greater are accepted facts and are confirmed by the operating instructions which specify that the input voltage must be stepped up from time to time to maintain rated output. The discrepancy between laboratory efficiency figures and actual values was mentioned by Doctor Grondahl, the inventor, and he suggests the use of fully 15% lower values for average service conditions as contrasted with theoretical laboratory figures. Strangely enough the effect on efficiency with an electroplating tank as load is more drastic than with many other services because of the counter voltage which is developed by an electrolytic tank.

The technical published curves of Doctor Grondahl tell a complete story. On a storage battery load, without ballast resistance the initial output of the rectifier dropped 50% in 250 weeks and was still dropping at the end of the test. These losses with age can be reduced with ballast resistance in series with the


Curve #427
Curve #427
Volts
% Rated Load in Amperes
0
1/4
1/2
3/4
4/4
5/4
VOLTAGE REGULATION CURVE
500 Ampere, 6 Volt, Motor-Generator
500 Ampere, 6 Volt, Oxide Rectifier
7500 Ampere, 6 Volt, Motor-Generator
Note--
The next step of voltage adjustment on the rectifier would take it to 6.3 volts full load in one direction, 5.45 volts in the other.
A comparable Motor-Generator can be adjusted by means of field rheostat to 0.1 volts in either direction providing much finer adjustment.
The Electric Products Company

load. However, this represents an additional loss which would be prohibitive from the standpoint of cost.

The curves on rectifiers that accompany this article are laboratory values and were obtained with constant loads and temperatures. Doctor Grondahl warns against acceptance of serv-

ice data under such favorable conditions. The final settled values of efficiency and regulation on curve 426 and 427 would be something considerably less, as these plates were practically new. Comparatively the efficiency of the motor-generator would not change throughout its entire life if properly maintained.

Capacities

There is no class of electrical equipment more conservatively designed and better able to carry continuous heavy overloads safely than the modern electrolytic motor-generator set. Conversely, the rectifier is so adversely affected by heat that specific warning is issued against extended overloads. Plate temperature is the controlling factor for the reason that the copper oxide film on the plates, which actually accomplishes the rectification, breaks down if certain values of temperature are exceeded. Some very interesting data are available to us through the experiences of a public utility organization which has used metallic rectifiers for service at points where the noise of any rotating machines was objectionable. Their standard specifications limited the temperature on the rectifying buttons to 10°C. rise, whereas some of the rectifiers being manufactured and sold for commercial service show about 25°C. rise when new.

Power Factor

The claim of improved power factor of the rectifier over motor-generator equipment has no foundation as motor-generator sets of 1000 ampere capacity and above may be equipped with synchronous type driving motors with inherent corrective capacity. The rectifier operates at a lagging power factor. Leading power factor, in cases where it may be desirable, may be purchased to far better advantage in synchronous motors than in any other way, a feature not available on the rectifier.

Cost of Maintenance

The cost of brush replacement and commutator treatment will be pointed out by the manufacturers of rectifiers as outstanding maintenance costs. The relatively small cost of these items is well known from industry's experience with modern motor-generators. Estimates based on brush replacement as frequently as once every three years, show a total cost of this item on a 5000 ampere 8 volt generator not exceeding $85.00 per

year. During this period the saving in current cost due to the higher efficiency of the motor-generator would be more than $375.00 even if power is figured at only one cent per kilowatt hour.

Conclusions

The verified data which has formed the basis of this treatise produces the following evidence for comparison:—

1. Efficiencies as much as 30% higher than available in the rectifier with resultant savings in power consumed.
2. Voltage regulation not exceeding 3% plus or minus from no load to full load as compared with 25% to 50% in rectifiers.
3. Maintenance costs slightly higher for the motor-generator but compensated for many times over by savings from higher efficiency and close voltage regulation.
4. No deleterious effects from age on motor-generator but high losses in efficiency, regulation, and capacity in the case of the rectifier.
5. Lagging and therefore penalizing power factor in rectifiers. Availability of unity power factor motor-generators at no extra cost in most commercial sizes of generator and of leading power factor motors at slightly higher cost.

Although we have made every effort to substantiate all the data studied, the greatest verification of these facts will be found in the general acceptance by industry of the motor-generator type of equipment in spite of the many and varied claims of the sponsors of rectifiers.

We hope that this discussion will place you in possession of facts and figures that present a clear picture of the relative merits of the two types of equipment. Should any questions arise that are not answered in this discussion, whether pertaining to the motor-generators or the rectifiers, please feel free to call upon us for the answers from the information available in our records.

DISCUSSION OF MR. BERRY'S ARTICLE BY I. R. SMITH
WESTINGHOUSE ELECTRIC & MANUFACTURING CO.
EAST PITTSBURGH, PA.

My company manufactures the rectox copper oxide type of dry rectifier, which is sold through the Hanson-Van Winkle-Munning Company for electroplating service. Dry rectifiers in use

today in this field are of three types, copper sulphide, selenium, and copper oxide. Of these, I intend to discuss only the copper oxide, in the form manufactured by us. Since we make both motor-generator sets and rectifiers, we feel that we are in a good position to consider this problem of d-c. supply in a reasonably unbiased fashion. The modern motor-generator set is a highly developed, highly reliable piece of equipment. The rectox rectifier also has certain very desirable characteristics, which we think qualify it to handle a certain share of the applications in the electroplating field.

The rectox copper oxide rectifier is a device having no moving parts (except the ventilating fans), excellent efficiency, indefinitely long life, can be installed readily, without any special foundation, requires practically no maintenance or repairs.

Mr. Berry mentioned the aging characteristic of the rectifier, which he thinks will mean a rapid deterioration and short life in service. This is a point on which there need be no concern. We have been making this type of rectifier for nearly fifteen years. In the past ten or twelve years, many thousands of copper oxide rectifiers have been placed in industrial applications, where long life and reliability are essential. To cite one or two examples, — the rectox rectifier has become an accepted standard in the field of fire alarm telegraph battery charging, where obviously dependability would be the first requisite. There are about 15,000 such chargers in regular continuous service today in all parts of the country. Many of these have been operating eight and ten years continuously without repair or maintenance of any kind.

Another good example is in the operation of d-c. control and brakes, particularly in the elevator field. In New York City alone, there are probably 10,000 rectox rectifiers in this service, most of which have been in use for six or seven years, without replacement. By such records as these, the rectox copper oxide rectifier has established itself as dependable and long lived.

The plate rectifier, as used for electroplating work, has been in service abroad for about eight years, and in this country about four years. The principle of operation is exactly the same as in the disc type which is used on control and other small current applications. The only difference is to be found in the method of making contact to the plate, which has been well described by Mr. Berry.

It is true that dry rectifiers have aging characteristics. In the case of the copper oxide rectifier, by aging we refer to a gradual increase in forward resistance that occurs with time, which has the result of increasing the percentage regulation and causing the efficiency to be slightly reduced. This does not mean, however, that aging will, in a short time, cause the copper oxide rectifier to fail. All that it means to the operator is that instead of using, say, tap # 5 to get a certain output, he finds that he has to use tap # 6. In fact, he would rarely be conscious that any change in the rectifier characteristics had occurred. Most of the change due to aging occurs during the first year of operation, with very small changes resulting thereafter. Life tests running for ten years show this. In fact, such tests show no change in output whatever for the second five years of operation. Full provision is always made in the rectifier design for the aging factor and the user need never concern himself about it.

On the subject of efficiency, let me say at once that we can all agree that the full load efficiency of large capacity synchronous motor operated motor-generator sets is higher than that of rectifiers. This, however, is not the whole story. What counts is not the efficiency at the terminals of the generator or the rectifier, but the efficiency at the tank, or in other words, the 24-hour overall operating efficiency. Two important points bear on this.

First, a copper oxide rectifier can be turned on and off like a light, by means of pushbuttons located convenient to the operator. Hence, during off load periods, it is simple and natural to shut down the rectifier completely, thus eliminating all no load losses. This is possible because the rectifier will start instantly at full power with no loss of time. Motor-generator sets, on the other hand, are generally left running during the no load period, consuming considerable power in no load losses. This has a considerable bearing on the 24-hour operating efficiency of the installation.

Secondly, voltage adjustment of the rectifier is accomplished by means of changing transformer taps, not by the use of tank rheostats, which waste power. Hence efficient operation is obtained from the rectifier at all voltages. It is thus possible to operate each individual tank at the proper voltage from its own rectifier in a plating installation, thus obtaining frequently far better overall efficiency for the installation than can be

gotten by using a single large motor-generator set to supply the various tanks. A 12-volt generator may be 80% efficient, but if it is supplying a 6 volt plating load with the voltage reduced by a tank rheostat, then the overall operation of the system is only 40% efficient. A 6-volt rectifier supplying the same tank would operate at approximately 70% efficiency.

Finally as to efficiency, I must take issue with the curves shown by Mr. Berry, giving a full load efficiency of 60% for a copper oxide rectifier, which was furthermore greatly reduced after a year's operation. I have, during the past week, had occasion to check the performance of a 6 volt, 2000 ampere rectifier which has been operating for fourteen months. The full load efficiency when new was 72%, and when measured last week was still 72%. While we expect this figure to drop slightly due to aging, as already pointed out, nevertheless this rectifier had not changed in its first fourteen months of operation, from which you get some idea of how small a part aging plays in the normal operation of a rectox rectifier.

The high power factor of the rectox rectifier is, as shown by Mr. Berry, approximately 95%. This is an advantage to the user, in view of the increasing use of penalty clauses by power companies for low power factor. Such penalties generally start at 80%, with occasional limits set at 85 or even 90%, so that the user of the rectifier is well above the maximum limit at which any penalty may start.

Voltage regulation, as Mr. Berry has pointed out, is of the order of 30% for the copper oxide rectifier. This fact should always be kept in mind so that improper application may be avoided. Obviously, if it is desired to operate several tanks with varying loads and hold this voltage within close limits, a rectifier should not be used. When voltage conditions are not critical, or when the load on the rectifier is a single tank, then it is proper to make the application. Voltage adjustment is readily made by the operator, simply turning a dial switch giving small changes in voltage for each step. The dial switches and the on-off push-button, together with the meter, are mounted on a control box which can be located convenient to the operator.

Maintenance and repairs for the rectox are negligible. Our oldest 2000 ampere, 6 volt rectifier has been operated by our customer for four years, without his having spent one cent for

repairs or maintenance. As Mr. Berry has shown, the copper oxide rectifier is made up of a large number of plates connected in parallel. These may be in a single cubicle or unit, or in larger sizes, several cubicles may be operated together in parallel. This general construction is advantageous from the maintenance standpoint since if trouble occurs, one section of the rectifier can be cut out and operation continued on the remainder. Likewise the connectors to the individual plates are so proportioned that if a single plate fails for any reason, it is automatically cut out of the circuit without interrupting the operation of the rectifier, simply by burning off its connector.

It has been pointed out that all moving parts have been eliminated except the ventilating fan. This, however, is driven by a small induction motor, one of the most reliable pieces of electrical equipment there is. Hence, there is really nothing in a copper oxide rectifier that should wear out or require replacement.

Mr. Berry has raised the question of limited overload capacity of copper oxide rectifiers, based on the danger of exceeding the safe temperature limits for the plates. So far as overload capacity is concerned, rectox rectifiers are given the same guarantee as to overload in amperes as is standard for motor-generator sets. It is rather commonly thought that a sharp line of demarcation exists between safe and unsafe operating temperature points for the rectifier. This is not the case. Temperature by itself has no significance, and only becomes safe or unsafe when considered together with a particular duty on the rectifier under the conditions of ventilation or cooling that exist.

Rectox units for industrial applications have always been designed and rated for operation with normal ventilation at about 10°C. rise, when self-cooled. Fan cooled units, such as used for electroplating, are operated with still lower temperature rises, about 6°C. Operation on permanent current overloads does not bring about any hazard of failure, but simply an increased temperature rise which can result in an increased rate of aging of the rectifier elements if the overload is maintained. If the overload is only incurred for a few hours, it will have no effect. It should perhaps be emphasized that overload is permissible in current, as stated, but not in voltage.

A minor point of general interest in Mr. Berry's paper should

be corrected. The use of rectox rectifiers for operating motion picture arcs and for telephone applications has not been eliminated by the development of motor-generator sets. The fact is that the Bell Telephone Company itself now makes copper oxide rectifiers for its own use and in large quantities. In the motion picture field, the competitive picture between rectifiers and motor-generator sets has not changed and there has been no lessening of copper oxide business in this field except as affected by general business conditions.

The question has been asked as to the use of the rectifier in corrosive atmospheres. All types of static rectifiers, copper-sulphide, selenium, or copper-oxide, as well as motor-generator sets, use materials in their construction that are subject to deterioration in corrosive atmospheres. Naturally a good electrical construction man will want to install such apparatus where it will not be subjected to excessive corrosive atmospheres. The copper-oxide plates are varnished to protect against mildly corrosive atmospheres. It is recommended that the cubicle containing the rectifying elements be installed outside the plating room where a supply of clean air is available for ventilation. If necessary to install the rectifiers in the plating room it is recommended that the ventilating air be brought from outside by means of ducts. Such an installation, involving 62 kw of output capacity, has been operating at our Newark Works for about fourteen months. Installation of the cubicle containing the rectox rectifying elements outside of the plating room can be conveniently made since a separate operator's control cabinet is standard for ratings over 300 amperes, making access to the rectox cubicles by the operator entirely unnecessary.

Much is made of the fact that motor-generator sets have been known to operate for 20 to 25 years, and the suggestion seems to be that rectifiers should not be adopted because there may be a question as to whether they will last that long. Of course, we won't know if the copper oxide rectifier will operate for twenty years until we have actually run one that long. But if the electrical industry or the plating industry waited twenty years before trying out each new development, progress would have been much slower than it has been. Instead, the rectifier should be considered as a new tool which can be used in electroplating, so that the problem is to find out how best to use it.

A Brief Discussion *of* Still Tank Pickling

By JAMES P. APROBERTS
Engineering Dept.
Lockheed Aircraft Corp., Burbank, Cal.

Read at Los Angeles Branch Meeting
February 12, 1941

THIS article was written to meet the desire of platers to participate in the National Defense Program. Its chief purpose is to cover general pickling practice and to assist the plater in meeting additional job pickling requirements. The chief reason for cleaning and descaling metal prior to plating is to improve the durability of plated coatings. Since this has been found to depend upon the adhesion between the base metal and the electrodeposit, a considerable amount of study and research has been made upon the means of obtaining a suitable bond[1]. The results of this work show that the best and firmest bond between the work and the coating exists when the first layer of the coating is in direct contact with the metal itself. Of course the only way for this to occur is after all dirt and scale have been removed.

The removal of scale and rust, or as the chemist would say, metallic oxides and corrosion products, by chemical or electrochemical action, is commonly known as "pickling," and sometimes more correctly as "descaling." "Pickling" differs from the more general term "cleaning" which involves the removal of dirt, grease and other films, as well as rust and scale. "Passivating" is often confused with pickling because acid baths are commonly employed for both passivating and for pickling. Actually, passivating is not a cleaning process either, but is the development of a protective coating which may interfere with rather than assist in plating.

At present there are three general methods employed in the removal of rust and scale: mechanical action (scouring or sandblasting), electrochemical dips (electropolishing and electropickling), and immersion in still tanks.

The sandblasting process is a surface cutting operation, hence it may serve the dual function of both "cleaning" and "pickling" at the same time. However, a hydrofluoric acid pickle is sometimes necessary to follow up sandblasting in order to remove imbedded particles of sand. This method is not satisfactory

if a smooth surface is desired. Sandblasting is usually more expensive than pickling as a method of scale removal. Another disadvantage is in the intense and highly localized action whereby accessible parts may be worn undersize or even perforated, and on the other hand, inaccessible parts may remain unaffected. The four main advantages of sandblasting are less limitation as to the size of work which can be handled, freedom from the possibility of hydrogen embrittlement, speed of action, and possibilities for treatment of localized rust and corrosion areas.

While we have mentioned sandblasting as a typical example, the same discussion would apply with almost equal force to other methods of abrasion. Two interesting applications of the scouring principle are the "Hydroblast" of the American Foundry Equipment Company and the "Roto Blast" of the Pangborn Corporation. In the "Hydroblast," a stream of sand and water is played upon castings under high pressure while they are being tumbled in a rotating barrel. In the "Roto Blast," steel shot or other abrasives are propelled by centrifugal force against the work. Other methods such as grinding and wirebrushing obviously belong in this category. In each case, abrasives harder than the scale encountered are required in order to remove the scale by physical force.

We will not go into the electrochemical methods of scale removal in this paper but will confine ourselves to the more generally used class of pickling, the chemical or still tank dip. The expensive equipment required for the application of mechanical methods is eliminated in still tank pickling since it is only necessary to provide an acid-proof container. As compared with the electrochemical method of pickling, the still tank method requires no exterior source of current, hence there are no problems of racking, current density, throwing power, or voltage control.

In a chemical dip the metal is immersed in a solution of one or more of the following acids: hydrochloric, sulphuric, nitric, hydrofluoric and possibly acetic and phosphoric, or even chromic. The choice of formula depends upon the nature of film encountered. Formerly, the action of the acid was considered to be hastened by the use of "promoters" such as arsenic or mercury. This practice is now being discouraged since it has been found that hydrogen embrittlement was also "promoted" as the result of an increased attack of the acid on the base metal[2]. Heating

the solution as high as 170°F. is a more satisfactory means of accelerating the action. This is done by using acid-proofed steam coils, or by piping live steam directly into the solution, or applying heat by some external means. Heating beyond 170° will tend to cause excessive evaporation and may impair the effectiveness of additives such as "inhibitors," which we will discuss later. An interesting point to be observed in this connection is the effect of temperature on the speed of the pickling. As a general rule, it varies greatly with the temperature of the pickling bath, doubling its speed with every fourteen to seventeen degrees rise in temperature. The speed on ordinary low-carbon steel (open hearth process) at 170° is about 5 times as fast as it would be at 140° F. On some other alloys and Bessemer steels, this rate is even faster, so that even 180° is sometimes too hot for a good job unless a strong inhibitor has been added to supress the action on the base metal.

Pickling Formulas

The acid to be used is determined by the nature of the scale to be removed from a particular metal. Of the previously mentioned acids, sulphuric, hydrochloric and hydrofluoric are used on steel and iron; while sulphuric, nitric and hydrochloric are employed for brass. The use of acetic and phosphoric acids appears to be limited, although the latter offers the added advantage of creating a metallic phosphate film which gives better paint adhesion and corrosion protection but does not improve plating. Magnesium is currently being given a chrome-pickle (sodium dichromate plus nitric acid) or it is treated with hydrofluoric acid to remove surface films and to offer improved corrosion resistance[3]. In this connection, it would be well to mention that treatments which are applicable to magnesium, such as the hydrofluoric acid pickle, have an adverse effect upon aluminum and vice versa. For instance, nitric acid passivates aluminum but dissolves magnesium at an alarming rate.

The following formulas will serve to illustrate these points:

BRASS: Preliminary dip to remove oxide scale produced by hard solder or brazing[1].

8 Ounces of 66° Be. sulphuric acid per gallon water

Scaling dip — oz. per gal.	Bright Dip	
48.0 — 66° Be. sulphuric	54.00 — H_2SO_4	Same
9.0 — 40° Be. nitric	9.00 — HNO_3	Baumé
0.5 — 20° Be. hydrochloric	0.25 — HCl	Values
68.0 — . . of water	61.00 — H_2O	

Another Bright Dip is made up as follows:

Sulphuric — 2 gallons
Nitric — 1 gallon
Water — 1 quart

Both of these bright dips rely upon the presence of hydrochloric acid which is added to the last mentioned solution in the amount of 1 ounce for 5 gallons. An excess of HCl will cause the work to come out spotty. Addition of wood soot will correct this effect by adsorbing the excess chlorine.

The 1940 Plating and Finishing Guidebook[4] also mentions these as suitable pickles for copper and copper alloys:

"Sulphuric Acid Pickle"
H_2SO_4 — 1 part
H_2O — 4 parts — Temperature 150 to 175° F.

"Bichromate Pickle"
H_2SO_4 — 1 part
Na_2CrO_4 — 2 oz./gal.
H_2O — 4 parts
Temperature 140 to 160° F. or may also be used "cold" (i.e. room temperature)

"Bichromate pickle" is not suitable for subsequent plating, since the chromium passivates the metal and impairs the adherence particularly of nickel deposits. A bichromate dip will also "decopperize" or increase the zinc content of the surface and thereby give the base metal a lighter than natural shade. The corrosion resistance is somewhat improved.

The above condition can be remedied by using a solution of from 2 to 4% sodium cyanide (NaCN) which will remove the stains and thus perform as an "alkaline pickle" in contrast to the "acid pickles" which we are discussing in this paper. Hydrochloric, also known as muriatic acid, is sometimes used to "wash off" the excess zinc and the chromate layer.

A "fire off" or "scaling dip" for preliminary smoothing of brass may be made up as follows[4]:

H_2SO_4	—	2 gallons
HNO_3	—	1 gallon
H_2O	—	5 gallons

Iron castings are occasionally dipped in a 20% solution of hydrofluoric acid (HF) to remove imbedded or "burnt off" sand particles[5]. They are also generally pickled by concentrations of between 5 to 15% sulphuric acid which is usually heated from 120 to 180°F. with or without the use of an inhibitor, the latter factor depending upon the duration of the immersion. Hydrochloric dips range from 7 to 20% by volume and, for some plat-

ing purposes, these limits are often exceeded at either end and are unheated.

An important factor to be observed in the pickling of steels is the alloy content. The presence of carbon in the form of iron carbides accelerates the solution of iron in acids as is shown by the occasional presence of carbon particles (soot or "smut"), particularly on the surfaces of high carbon alloy steels.

In electroplating, the solutions are generally discarded much before the content of iron sulphate or chloride attains a concentration of even 5%; because it is felt that rinsing difficulties may arise from the precipitation of iron stains (basic ferric salts) on the work in the rinse tank. In this connection, it would be well to note the practice still alleged to be followed by some old time picklers of throwing some of the old pickling solution back into the new bath — possibly to pay tribute to the effectiveness of former baths or else because of some unexplained catalysis[6].

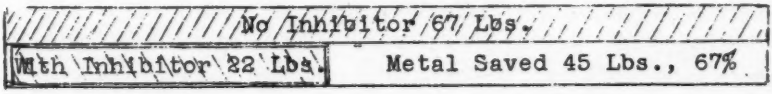
Actual choice of the pickling solution, aside from the alloy content of the steel, depends upon the nature of scale and other corrosion products which are to be removed prior to plating. In some cases, the surface material is a combination of two or more corrosion products and in such instances more than one acid may be necessary to completely descale the work. For example, the following two-component formula is used on iron castings with sand particles: 6 to 8% sulphuric acid and ½ to 1% hydrofluoric acid at a working temperature of around 140°F.[5] Perhaps even more illustrative of this is a solution used on the smooth pickling of stainless steel. The oxides which are formed on these metals at high temperatures during annealing, soldering or welding will alter the normally passive (corrosion resistant) coating and create a complex mixture of the various oxides of iron, nickel and chromium. The removal of these oxides is best solved by the use of a ferric sulphate-hydrofluoric acid mixture wherein the ferric sulphate content varies from 6 to 12% and that of the acid 1.5 to 3%, according to the type of stainless steel used, such as hot rolled sheet, cold rolled strip or tubing[7].

Regardless of the metal being pickled, when treating assemblies or other parts likely to be hollow, such as sealed tubing, caution must be taken to see that acid is not entrapped where it will have a corrosive effect, or be apt to slowly trickle out and either interfere with processes following or else stain the work, usually

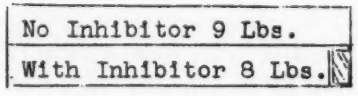
doing both. This may be prevented by locating any holes in the work and closing them up with "kalons" or set screws.

Another point which must be taken into consideration is the use of inhibitors. By this we mean a substance which, in the words of O. T. Towner[5] "will permit the removal or rapid solution of the various scales or oxides by an acid, and retard the action of the acid on the metal itself." In other words, the purpose of an inhibitor is to save the base metal, as is shown below in Fig. 1.[8]

The mechanism of an inhibitor is that the inhibitor, being a finely dispersed colloid, will surround and adhere to the metal. The pickling acid will react on the scales and form a ferrous or ferric salt which dissolves in the bath. Its action on the base metal, which ordinarily liberates hydrogen, will not occur to as great an extent, since the inhibitor prevents this hydrogen formation or further oxidation. Zapffe and Faust[2] showed that inhibitors are effective in protecting the base metal from acid attack, that they also keep hydrogen from diffusing into the base metal and becoming occluded therein, and that they have a definite effect upon preventing hydrogen embrittlement.

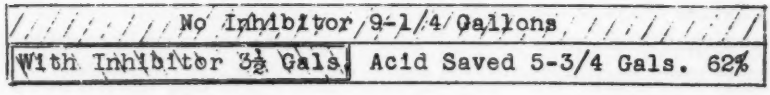


ILLUSTRATING THE EFFECTIVENESS OF INHIBITORS IN SUPPRESSING ATTACK ON THE BASE METAL



—Retarded Speed on Scale 1 lb.

ILLUSTRATING THE EFFECT OF INHIBITORS ON THE ACTION OF THE ACID ON SCALE



ILLUSTRATING THE EFFECTIVENESS OF INHIBITORS IN CONSERVING ACID

BATH: 66° Be. Sulphuric Acid 5% Water. 95% With and Without Added Inhibitor *TURCO ACRYL* 0.1%

(Fig. 1)

To sum up the functions of an inhibitor, we may say that:

1. It does not interfere with the normal operation of the acid.
2. It prolongs the life of the acid since less metal is dissolved and the amount of iron salts accumulated is smaller.
3. It saves the base metal and helps to prevent overpickling.
4. Not only does it prevent embrittlement, but it also helps to preserve the bright smooth original iron or steel surface and thus aids in obtaining smoother, brighter electrodeposits.

Several inhibitors are on the market. Typical of these is a local product, "Turco Acryl," which deserves mention here since it conforms to the United States Navy Department Specification 51-I-2[9] covering the requirements for inhibitors. This specification is of interest because it describes the performance characteristics of a good inhibitor.

1. In order that the inhibitor will not interfere with subsequent electrodeposits, it must be nonstaining and free rinsing. This means that such an inhibitor will be freely miscible in the pickling acid. It must create no tarry suspension or oily film upon the surface or sediment which would be deposited on the work, thus causing grief for the plater.

2. It must be of the non-foaming type. This property is especially important since a layer of foam would obscure the visibility of the work in the pickling tank, necessitate more rigorous rinsing or even further cleaning, and offer a potential hazard from sparking of the hydrogen gas filled bubbles. Injuries have resulted from explosions of these bubbles, since the acid is scattered in all directions.

A satisfactory inhibitor must be non-poisonous and must yield no toxic fumes or gasses when mixed into the pickling bath. It must not react with nascent hydrogen to form poisonous gasses such as HCN (cyanide fumes), PH_3 (phosgene), AsH_3 (arsene), H_2S (hydrogen sulphide) or Cl_2 (chlorine).

4. The effectiveness of the inhibitor is best stated in the above-mentioned specification, which is quoted from as follows: "When used in the proportion of 1% inhibitor to actual acid, the inhibitors shall have a merit value of not less than 1.10. (Note: this means that it shall be 10% more effective in inhibiting base metal removal than the standard comparison inhibitor (diorthotolylthiourea). To safeguard against greatly increased

pickling cycles, which would add to the labor cost in pickling, the life of the processed bath shall not be more than four times the life of the plain acid bath for an inhibitor to be acceptable."

This shows that although an inhibited pickling solution has a much longer effective life, it does not greatly increase the pickling cycle. Hence, the only unusual thing about the current use of inhibited pickling solutions is that these are not being used more extensively in the electroplating industry.

In conclusion, simple dip pickling, particularly when the solution is inhibited, offers many advantages over the other methods of scale removal. The necessary equipment is simple. Control of pickling solutions was likewise shown to be elementary; the chief methods employed in refining or strengthening the solution are either addition of a suitable adsorptive agent such as wood soot[4], or strengthening the solution by merely adding more concentrated acid. Of course, the common practice among electroplaters is to throw out the solution as soon as it becomes too sludgy or the pickling time cycle is too long.

Although there are many solutions in common use today, they vary according to the metal scale to be removed and are relatively simple in their composition. The two main drawbacks to pickling are overpickling and hydrogen embrittlement. The former can be satisfactorily overcome by properly inhibiting the solution, which also helps to avoid the latter trouble. Inhibiting was further shown to be an economical means of controlling the removal of base metal and increasing the life of the bath.

REFERENCES

1. "Principles of Electroforming and Electroplating," W. Blum and G. B. Hogaboom, McGraw-Hill (1930), pp. 138-154.
2. "Metallurgical Aspects of Hydrogen in Electroplating," C. A. Zapffe and C. L. Faust, "Proceedings of the Educational Sessions of the American Electroplaters' Society" (1940), pp. 1-20.
3. "Dowmetal Magnesium Alloys," the Dow Chemical Co., (1940), pp. 53-59.
4. "Plating and Finishing Guidebook," (1940), Metal Industry Publishing Co., pp. 19-22.
5. "Pickling of Metals for Electroplating," O. T. Towner, "Proceedings of the Educational Sessions of the American Electroplaters' Society" (1940) pp. 80-86.
6. H. Stafford, private communication.
7. "Pickling of Stainless Steel," L. F. Loutrel, Jr., "Metal Finishing," pp. 645-6, (Dec. 1940).
8. Turco Acryl, Bulletin No. 596, Turco Products, Inc., 6135 South Central Avenue, Los Angeles, California, p. 3.
9. U.S. Navy Department Specification 51-I-2 (March 1, 1930) "Inhibitors, Pickling."

MILWAUKEE BRANCH

AMERICAN ELECTROPLATERS' SOCIETY

ANNUAL EDUCATIONAL SESSION AND BANQUET

Schroeder Hotel **Saturday, April 26, 1941**

EDUCATIONAL SESSION 2 p. m. GREEN ROOM

R. F. McGuire—Donald Sales & Mfg. Co. *Rust Proofing with Cadmium*

Wm. C. Geissman—*The Chemical Engineer and Electroplating*

Vincent Mattacotti—Hanson-Van Winkle-Munning Co. Subject to be announced later.

BANQUET at 7 p. m. CRYSTAL BALLROOM

Dancing Entertainment

Reservations $3.00

Robert Steurnagel
2370 N. 32 Street, Milwaukee, Wis.

THE TWENTY-NINTH

ANNUAL EDUCATIONAL SESSION AND BANQUET

of

NEWARK BRANCH A. E. S.

At the Hotel Robert Treat, Newark, New Jersey

SATURDAY, APRIL 26, 1941

Educational Session 2:30 P. M. Banquet 7 P. M.
Tickets $3.00 each

SPEAKERS

Floyd Oplinger, E. I. duPont deNemours & Co., "Tin Plating and Its Application."

Dr. Walter R. Meyer, Editor, *Metal Finishing*, "Engineering Aspects of Electroplating."

George B. Hogaboom, Hanson-Van Winkle-Munning Co., "Design for Finishing."

H. E. Haring, Bell Telephone Laboratories, "Corrosion."

Newark Branch Ladies Auxiliary will entertain out-of-town ladies in the afternoon.

George Wagner, Secretary

Here and There

NEW HAVEN BRANCH MEETING

The regular meeting of New Haven Branch was held at Yale University on Tuesday evening, March 25. The speaker was Joseph L. Downes, Remington-Rand Co., Elmira, New York. His subject was "Black Nickel." There was a good attendance. President Tom Chamberlain presided and introduced the speaker. Joe traced the history of black nickel from its earliest use as a protective coating to the present time, telling of the various formulae that have been used from time to time both in the U.S.A. and foreign countries. He told many interesting stories of his plating experiences in and around New York and Connecticut.

Like the prodigal of old, the fatted calf was killed in honor of Joe's return to his own branch as a speaker. A small party of friends got together and had lunch before the meeting. At the conclusion of his address many questions were asked. The answers were given in Joe's inimitable style, with plenty of genuine Irish wit thrown in. It was a good meeting, the old timers particularly enjoying the address and the reminiscenses that followed.

PITTSBURGH BRANCH MEETING

Pittsburgh Branch held its first annual Educational Session and Banquet on Saturday, March 15 at Mellon Institute. President Stanley Hedden introduced the branch librarian, R. A. Dimon, who acted as chairman of the Educational Session. Mr. Morris Stone read a paper on "The Future Outlook of Coated Strip." This was followed by papers on "Metallography," "Temperature Control," "Diffusion," and "Rectifiers." The authors were D. H. Rowland, metallurgist, Carnegie-Illinois Steel Corp., Research Lab.; Mr. F. Behar, editor of "Instruments" Magazine; B. B. Lustman, research engineer, Standard Steel Spring Company; and I. R. Smith., Westinghouse Elec. & Mfg. Co. The chairman of the Research Committee of the A.E.S., Mr. A. B. Wilson, showed moving pictures of the Chevrolet Bumper Plant at the conclusion of the reading and discussions of the papers presented.

The session was well attended. There was a general feeling of satisfaction with the whole program. The committee is to be congratulated for securing the services of the authors mentioned and for the educational value of the subjects discussed. Favorable comments were heard regarding the banquet. Major L. R. Quinn, vice-president of Enameled Metals Co. acted as master of ceremonies and spoke on "The F. B. I.'s Task Today," and Cy Hungerford gave sketches and remarks. The change from the usual sameness connected with banquets in general was appreciated. President Fulforth and the Executive Secretary drove from the "Quaker City" to the "City of Smoke." It was a grand trip at 70 m.p.h. over the new super highway.

Pittsburgh Branch is really going places; there are a number of fine young men including F. R. Keller, the branch secretary, who are stimulating interest in the social and technical welfare of the Society. The membership is growing, too.

What a beautiful building to meet in! No wonder E. S. Taylerson threw out his chest when he conducted us through the Institute. Well done, R. A. Dimon; you make a very fine presiding officer. Our good friend Dr. Harold Work attended the meeting. It was good to see him again. Discussing the meeting on the way back to Philadelphia, we both agreed that Pittsburgh Branch has made an excellent start with its first annual meeting. Let's have more of them and thanks to everybody for a fine time.

GUSTAF SODERBERG SPEAKS AT SYRACUSE

With an attendance of more than sixty persons, the March meeting of the Binghamton-Syracuse Branch was held at the Onondaga Hotel, Syracuse, on Friday evening, March 28. Members and friends from long distances

were present to greet Gustaf Soderberg of the Udylite Company, Detroit, who chose for his subject "Plating Room Control." Mr. Soderberg reminded his listeners of many things in the plating room that are often overlooked, but which, if properly controlled, would mean money saved in labor and material. He advised every plater to check his equipment to see that there are no leaky tanks or other causes of waste, especially at this time when every ounce of metal should be carefully accounted for.

A long question and answer period followed the address until George Simmons, president of the branch, decided that it was time to bring the meeting to a close as the hour was late. Amidst prolonged applause, Mr. Soderberg was given a rising vote of thanks.

From the conversations we had with some men in industrial plants and small plating shops in Syracuse, it would seem logical to hold meetings every month in that city of over 200,000 inhabitants. These persons who are prospective members said that they would be glad to attend meetings if and when they are held there, but that it was too far to go to Cortland or Binghamton during the winter months.

The branch has a problem in this respect and one that the members alone can solve. One thing is proved beyond doubt, that Syracuse as a large manufacturing center has been neglected too long by the A.E.S. It is not our intention to dictate the policies of the Binghamton-Syracuse Branch. May we suggest, however, that if possible a member of the A.E.S. from the latter city who has the best interests of the Society at heart be included in the officers at the coming election and that more consideration be given to holding the meetings where the greater number will be benefitted?

We have the highest regard for the present membership of the branch which has functioned under the most adverse circumstances, as far as weather is concerned. We believe that with their cooperation, a method of reaching the parties interested in the A.E.S. in this section of New York will result, to the satisfaction of all.

Rochester Branch sent a sizable delegation to the meeting including Judson Elster, the secretary, and Ray Berghold, the live wire A.E.S. salesman. Joe Downes came from Elmira and Bert Sage from Boston. Mrs. Sage came too, and stayed with friends in Herkimer. Bert did a splendid job of boosting the Convention when called upon for a few remarks by his old boss, George Simmons.

We wish to thank Dwight Overcash of the Brown-Lipe-Chapin Company for his courtesy and cooperation during our stay. We were glad to shake hands with Guy S. Cole of the same company. Both of these men are members of Anderson, Indiana, Branch. Our thanks are extended to the Udylite Company for sending Mr. Soderberg. We appreciate also the hospitality extended by Mr. George of the Udylite Company who came from New York and to Mr. and Mrs. Simmons for our stay at Herkimer from whence we returned home with Bert Sage as driver.

NEW HAVEN PLATERS' CLASS ANNUAL STAG PARTY

The annual banquet of the platers' class of New Haven Branch was held at Hejaz Grotto on Saturday evening, April 5. Over fifty members and guests were present. President T. H. Chamberlain acted as toastmaster. After a fine chicken supper, which was thoroughly enjoyed, Mr. Chamberlain called upon first vice-president of the A.E.S, Ellsworth Candee, for a few remarks. Mr. Candee confined his remarks to "Membership in the A.E.S." Joe Sullivan, Bill Ehrencrona of Bridgeport, Earl Couch of Waterbury, Edgar W. Luther, Doc. Garner, the genial secretary of the branch, and the Executive Secretary all followed with short, snappy remarks concerning the future of the branch and the class.

Mr. Chamberlain brought the event to a close with a short address in which he praised the fine work done by Jack Harper in the sale of tickets and Charlie Koelbl for providing the entertainment and acting as chairman of the banquet committee.

George Morrow, the Bridgeport Branch magician entertained the group with some breathtaking sleight-of-hand performances. There were other features also to keep the boys amused including pool and bowling.

RESEARCH COMMITTEE MEETING AT NATIONAL BUREAU OF STANDARDS

The meeting, on March 6, was called to order at 2:30 P.M. by Chairman A. B. Wilson with R. A. Dimon acting as secretary. The following were present: *Members*: A. B. Wilson, E. A. Anderson, C. E. Heussner, F. J. MacStoker, B. H. McGar, F. C. Mesle, T. F. Slattery, Erwin Sohn, E. S. Taylerson, Abner Brenner (for W. Blum), A. W. Tracy (for E. T. Candee), W. J. R. Kennedy.

Visitors: E. M. Baker, University of Michigan; R. A. Dimon, Carnegie-Illinois Steel Corp.; R. L. Hungerford, American Brass Company; J. C. Fox, Doehler Die Casting Company; R. J. McKay, International Nickel Company; Gustaf Soderberg, Udylite Corporation; R. A. Zinkil, Crane Company; G. A. Lux, Research Associate.

As the purpose of this meeting was to obtain firsthand information as to the work being carried on by our Research Associate and his assistant, the Chairman first called on Mr. Lux for his report. Mr. Lux explained some of the difficulties and delays encountered in polishing the steel samples at Utica. He also described the difficulties involved in trying to obtain mirror finishes by buffing the nickel after plating over the coarser grits. Panels were exhibited to illustrate these problems, and it was shown, by weight loss figures, that excessive buffing had removed a considerable portion of the nickel. It was the unanimous opinion of those present that only the normal amount of buffing be done on all the samples, regardless of the final finish obtained. In the case of the bright nickel all samples are to be buffed only enough to remove a slight "bloom" present on the surface after plating.

Some disappointment was expressed that the polishing lines from the 220 grain samples were still visible after nickel plating and buffing. Mr. Lux explained that in order to get uniform weight loss figures, it was necessary to discard and re-head these wheels somewhat earlier in their life than was customary in practice and that this probably caused these finishes to be somewhat coarser than those ordinarily obtained with 220 grit wheels. Mr. Taylerson thought that some higher finish samples than these 220 grit specimens should be included to satisfy objections on the part of practical platers that the final finish was not high enough and Mr. Heussner's motion that the producing of these higher finishes be left up to Mr. Lux and the Divine people was passed unanimously. Two sets (five panels at each location) will be used for this purpose.

Mr. Anderson showed samples of curved panels obtained by cutting down a production zinc alloy die casting made by Doehler in one of their regular molds. The panels are $3\frac{1}{8}''$ x $5\frac{3}{8}''$ with a slight curvature and could be supported on the regular exposure racks by punching new holes in the 0.080" thick angles and relocating some of the porcelain insulators. He said that the castings were of good quality and that the die would be available for several years. Mr. Lux said that the threaded boss on the back of the casting would be a help in holding during polishing and plating. Mr. Anderson's motion that the Doehler Die Casting Company's offer of these castings be accepted was carried unanimously and Mr. Heussner was designated to follow up the obtaining of these castings with Mr. Fox.

Mr. Wilson said that Dr. Blum wanted to know if exposure tests should be initiated in June on the steel and brass samples if the zinc alloy die castings were not ready. It was unanimously agreed that they should be inasmuch as no particular correlation between the different base metals was sought.

The meeting was followed by an inspection of the plating and buffing facilities which have been made available for this work.

R. A. DIMON, *Acting Secretary.*

FELLOWSHIP CLUB TO HOLD SUPPER DANCE

On Tuesday, March 25, Mr. David X. Clarin, Mr. John C. Oberender of the International Fellowship Club, and Mr. Joe Barron, General Chairman of the Boston A. E. S. Convention Committee, met at the Statler Hotel with reference to holding the Fellowship Club Supper Dance on Monday night, June 9. Due to previous commitments the Hotel Statler folks said that it was simply impossible to care for so large a party on the night of June 9.

After careful consideration of the entire matter, the committee of three arranged for the holding of the buffet supper dance in the grand ballroom of the Bradford Hotel, a short distance away from the Hotel Statler. The accommodations at the Bradford Hotel will enable the International Fellowship Club to extend to their friends in the plating fraternity their usual splendid opportunity to get acquainted and to enjoy themselves thoroughly.

As has been the case on previous occasions, an excellent buffet supper has been arranged, and the music for dancing will be furnished by one of Boston's well-known dance orchestras. *Admission to the supper dance will be by ticket only.*

The banquet Thursday night, June 12, will be held in the Hotel Statler Imperial Ballroom which holds 1500 people comfortably.

LOS ANGELES ANNUAL EDUCATIONAL SESSION AND DINNER DANCE

The Annual Educational Session and Dinner Dance of Los Angeles Branch was held March 22 at the Los Angeles Breakfast Club.

The Educational Session was presided over by Mr. E. R. Holman, Branch Librarian, and was opened at 10:00 o'clock. A picture, "Norton Abrasives at Work," was shown by Mr. W. H. Turner of the Norton Company, Worcester, Mass. Mr. H. J. Kroesche, Sales Engineer, A. J. Lynch Company, Los Angeles, Calif., spoke on "Bright Nickel Plating," and told of some of the things that have been learned about this process since its introduction. This was followed by a paper, "Coatings for Electroplaters," by Mr. M. M. Loserman, Research Laboratories, division of Paraffin Companies, Inc., which told of some of the uses and advantages of various protective coatings.

At the afternoon session a film, "Leaching, Concentration, Smelting, and Refining of Copper," produced by the U. S. Department of the Interior, Bureau of Mines Experiment Station, Pittsburgh, Pa., was shown. Mr. Paul P. Mozley, Engineer, Materials & Process Group, Lockheed Aircraft Corp., then spoke on "Chromic Acid Anodizing in the Aircraft Plant." Mr. Mozley spoke of problems that had been encountered and results that had been obtained in actual production by his company. "Care and Maintenance of Vapor Degreasers" was the title of a talk presented by Mr. O. B. Moe, representing G. S. Blakeslee & Company, Cicero, Ill. Dr. T. K. Cleveland, Chief Chemist, Philadelphia Quartz Company of California, Ltd., spoke on "Some Properties of Alkaline Cleaning Solutions." "Cleaning and Plating Iron and Steel Parts of Electric Irons" by Mr. F. A. Maurer, Engineer of Processes, General Electric Company, Hot Point Division, Ontario, Cal. explained how this company employed a completely automatic cleaning and bright plating process in the production of electric flat irons.

Mr. D. N. Eldered, Supervisor of Technical Service, E. I. duPont de Nemours & Company at El Monte, California, will speak on "Recent Developments in Copper Plating," at the regular Branch meeting in May.

The members of the Branch and their friends assembled later for the most successful Dinner Dance Los Angeles Branch has had so far. Through the cooperation of our friends and members we are able to say that anyone who didn't win a door prize was very unlucky indeed as the number and quality of the gifts donated was, as our movie industry says, Colossal. Our only regret is that our Annual Dinner Dance comes only once a year.

CONVENTION HEADQUARTERS
HOTEL STATLER — BOSTON, MASS.

RATES — Each room has private bath — shower, or tub and shower.

ROOM FOR ONE PER DAY	ROOM FOR TWO PER DAY DOUBLE BED	TWIN BEDS
$3.50	$ 5.00	$ 6.00
$4.00	$ 5.50	$ 7.00
$4.50	$ 6.00	$ 8.00
$5.00	$ 6.50	$ 8.50
$6.00	$ 7.00	$ 9.00
$8.00	$ 8.00	$10.00
	$10.00	$12.00

THREE PERSONS IN ONE ROOM

$7.00	$8.00	$8.50	$9.00	$10.00	$11.00	$12.00

SUITE — LIVING ROOM, BEDROOM AND BATH

For one,	$9.50	$12	$16	$18
For two,	$12	$14	$16	$20

For Guests Who Desire Reservations Outside of the Convention Headquarters

HOTEL WESTMINSTER
COPLEY SQUARE, BOSTON, MASS.

Is Located

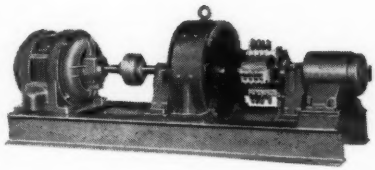
Two blocks from the Convention Headquarters where you can enjoy home-like hospitality and good food.

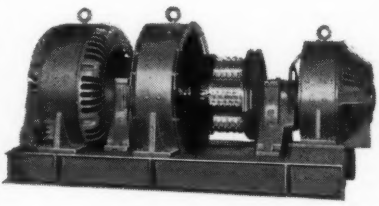
OUR RATES.

Single Room with Private Bath.....$2.50 per day
Double Room with Private Bath.....$4.00 " "
Double Room with Twin Beds and Private Bath.....$5.00 " "
Suites of Two Connecting Twin Bedrooms and Private Bath for Four Persons, $1.50 and $2.00 per person
Connecting Garage Rate.....50c per day.

Make Your Reservation Now.

H-VW-M CONTRIBUTIONS TO NATIONAL DEFENSE





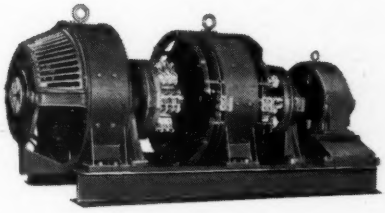
Our part in the defense program includes the design and manufacture of motor generator sets, both synchronous and induction motor drive, for special processes such as anodic treatment of the aluminum alloys, as well as standard motor generator units for plating processes in many key industries. We are proud that equipment bearing the H-VW-M symbol — tested by many years of exacting service — has been chosen for installations in these plants devoted to armament work.

Whether or not you are working on defense orders, the lasting efficiency and dependability built into each of these machines will help you maintain product quality and delivery schedules, while protecting your profits through minimum operation and maintenance costs.

Top: 500 amp., 40 volt set, with 30 h. p. induction motor drive and direct connected exciter.

Above: 100 amp., 40 volt set, with 60 h. p. synchronous motor and direct connected exciter.

At Right: 2000 amp., 6 volt set, with 20 h. p. synchronous motor and 125 volt direct connected exciter.



PLANTS: Matawan, New Jersey · Anderson, Indiana · Bridgeport, Connecticut

SALES OFFICES: Anderson · Bridgeport · Chicago · Cleveland · Dayton · Detroit · Elkhart · Matawan Milwaukee · New Haven · New York · Philadelphia · Pittsburgh · Springfield (Mass.) · Syracuse

Business and Social News

BRANCH NEWS

Educational Activities

AMERICAN ELECTROPLATERS' SOCIETY

Boston Branch met Thursday April 3, at the Statler Hotel, Boston, with President Jones in the chair. A communication was read from Newark branch inviting the members to attend their banquet; many will be there. Three applications were read and elected to membership.

A motion was made that a committee of three be appointed as a nominating committee for election of officers. They will draw up a slate to be presented to the branch at the next meeting; the committee is Bert Sage, Arthur Collins, and George Swift.

A motion was made that the June 5th meeting be held June 19th because of the convention; election of officers will take place at this meeting when all members should attend. Delegates to the convention will be named at the next meeting. The Executive-Secretary Bill Kennedy paid a visit to us and he is doing everything to make this convention the best ever held by the A.E.S. Always welcome, Bill.

After the regular order of business the chair was turned over to our librarian Arthur Collins who had a treat for the members, one that those attending will remember a long while. It was the showing of sound and color films of the "Manufacture and Use of Abrasives and Abrasive Products." It held every member's attention to the finish. The picture was given by Mr. Francis D. Bowman, Advertising Manager of The Carborundum Co. of Niagara Falls, N. Y., who answered all questions for the members.

A. W. GARRETT, *Secy.*

Bridgeport Branch held its regular monthly meeting March 6, at 8 P.M. at the Stratfield Hotel. President John E. Charleson opened the meeting.

R. J. O'Connor, General Chairman of the Third Annual Regional Meeting, gave us a good progress report of the Special Meeting held at the Hotel Elton in Waterbury on March 1, 1941.

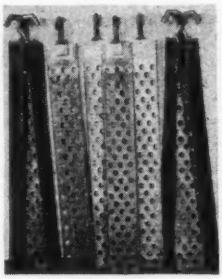
Applications for membership are coming in fine. Five men were elected to membership at the previous meeting indicating that the committee is doing good work with the assistance of our members. Members of the branch were very sorry to hear of the recent death of our good friend Jack Tierney. A card was received from the family of Kenneth Schnieder in the loss of his father, Mr. Albert J. Schneider, a retired fire captain of the Bridgeport Fire Department.

A discussion of the nickel anode situation was brought up by the various members of the Branch. This discussion proved very interesting from the standpoint of the Defense Program.

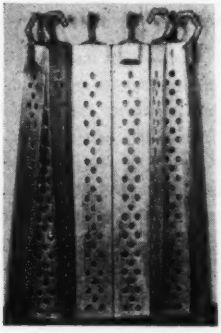
President John E. Charleson turned the meeting over to Librarian Clarence C. Helmle. This turned out to be a real live session on copper plating of zinc base die castings.

An educational session was held on February 28, 1941, at the Breakfast Room of the Stratfield Hotel at 8:30 P.M. with Clarence Helmle presiding. Ellsworth T. Candee of the Waterbury Branch and 1st vice-president of the Society was the speaker. He presented an illustrated talk on copper mining and refining which proved highly in-

Perforations Put Punch into Plating Performance



Perforated Armco Iron Anodes for Electro-Alkali Cleaning



Perforated Lead Anodes for Electro-Acid Stripping Operations

Improved current distribution is accomplished by the Storts perforated type anodes because all of the edges act as jumping-off points for the current. This type anode, available in steel, Armco Iron and lead.

Further refinements in Storts anode design include: a wide range of anode hooks for various requirements; heavily reinforced lead welds used in assembly; correct shaping for easy handling and easy cleaning.

Storts-designed anodes have been proving their superiority in service for more than ten years.

For a personal introduction to better anode performance write for a copy of our Chromium Plating Anode and Hook specifications.

STORTS WELDING COMPANY

42 Stone Street **Meriden, Conn.**

Manufacturers of Welded Fabrications to Specification

teresting to the guests and members attending.

JOSEPH G. STERLING, *Secy.*

Anderson Branch held a meeting on March 4 at the Y.M.C.A. where, with a near-record attendance, the members heard Mr. George Hogaboom of the Hanson-Van Winkle-Munning Company give one of his always interesting talks. His subject was "Information, Please."

Mr. Hogaboom, in addition to discussing various items of general electroplating practice, spoke for about an hour on the important part the electroplating industry is playing in the defense program. Iron plating and the plating of stainless steel also came in for their share of the remarks.

In conjunction with his discussion of the defense program, Mr. Hogaboom pointed out that electroplaters could be of great assistance in revising some of the decadent specifications under which some contractors are forced to do government plating.

The chapter was happy to have as its guests Dr. M. M. Beckwith, a member of Anderson Branch who lives in Detroit; Mr. W. R. Binai, president; Mr. L. E. Bass, secretary, and two other members of the newly formed Indianapolis Branch.

The transfers of Mr. Earle Esner and Mr. W. R. Binai to Indianapolis were effected and plans discussed for the coming party, and annual election of officers in April.

REX OYLER, *Secy.*

New York Branch held two scheduled meetings during the month of February at their headquarters in the Hotel Pennsylvania.

The first on February 14, was a business meeting at which final plans for the Proctor Diamond Jubilee Banquet were made and other items of Branch interest were discussed.

The second meeting on February 28, was an educational session, at which a round-table discussion by the Branch Educational Committee was had on the current problems of the Branch membership. An hour and a quarter of interesting debate and question making and answering. At this meeting before the educational session began the New York membership passed a resolution calling on the Branch to assume all obligations in maintaining the membership in good standing of all those members called in the Draft or volunteering in the National Defense and further that they trust that such action shall be emulated by other branches of the A.E.S. in the event they have not already done so, believing as they do that such a gesture would be laudable at this time and

EXPERIENCED ELECTROPLATERS
prefer
ANACONDA
Copper Anodes
... because their unexcelled purity assures uniform corrosion, the highest quality deposit in the shortest possible time and low scrap losses. Furnished with suspension holes drilled as desired, or tapped for end hooks.
ANACONDA
from mine to consumer
THE AMERICAN BRASS CO.
General Offices, Waterbury, Conn.
Offices and Agencies in Principal Cities

fruitful of good will and convenience to those of our fellows now and hereafter called in the National Preparedness Program and further that the Supreme Society of the A.E.S. take whatever steps are deemed necessary to assist those Branches who manifest a like intention in this connection.

There were three elections and two applications filed at these meetings.

FRANKLYN MACSTOKER, *Secy.*

Toronto Branch. April 4, King Edward Hotel, President Smith in the chair. This was strictly a business meeting. All standing committee reports were handed in. Report of the annual Banquet was read by Tom O'Keefe and a hearty vote of thanks was given to Tom and his committee of Graham, Kemish, and Medina.

John Acheson and Allan Byers received the hearty approval of the members for the part they played in the Toronto-Buffalo joint meeting at Niagara Falls.

Mr. Acheson read a letter from Mr. Kennedy that made the members sit up and think. This letter coming from an executive of our organization clearly expressed the mind of the man behind the pen the very heart and soul of the essence of goodwill. Thanks to you, W. J. R. K. Thanks a million.

Somebody started to talk about Boston, and it was not hockey this time; it was the Platers convention with Jack McLean being appointed as delegate and Bill Price as alternate.

Officers for the next fiscal year are as follows: President, Jim Graham; Vice President, Harry Hand; secretary, Allan Byers; librarian, Bill Price; trustees, Kemish, Turner, and Jack McLean; membership secretary, Art. Severs.

Archie Smith submitted 6 samples of chrome plating on steel, bronze, and aluminum. One piece showed about one sixteenth of an inch in thickness. The deposit was fairly bright and plated in England.

JAMES S. CAIRNS.

Rochester Branch held its meeting at the Seneca Hotel on March 14. We had as our guest speaker Mr. Edwin Rinker, Research Chemist of the Oakite Products Company, who gave as his talk the "Anodic Cleaning of Metals." The talk was a very interesting one and Mr. Rinker was bombarded with questions all of which he very capably answered. After the talk the members were entertained by that master of legerdemain, Mr. Dave Claron, also of Oakite, who never seems to lack some sort of a trick to pull on his many friends. Come again Messrs. Rinker and Claron.

The Rochester Branch, in conjunction with the National Defense

Quick Service and Courteous Attention to Needs is Our Only Excuse for Being in Business

But We are 25 Years Old

And Growing in Size Every Year

A. T. Wagner Co.

Plating Equipment and Supplies

2700 Wight St. Detroit

Fitzroy 3171

Program and with the cooperation of the Rochester Board of Education, is embarking upon another ambitious program. At Tech High, Rochester already has a school for electroplaters with the capable tutelage of Mr. Ralph Gibbs. Under Mr. Gibbs' direction and with the aid of some of the members of the Rochester Branch all men now working on plating or in some capacity in a plating room and who desire to learn more of the methods of electroplating are invited to register and attend classes on Wednesday and Friday nights from 7 to 10 P.M. starting on Wednesday night April 2, 1941. There is to be no charge for this course and the curriculum will include chemical analysis procedure for all plating solutions and a practical course in general plating with a small group doing some research work. Our educational chairman, Mr. Phillip LoPresti is working hard on this project and expects a capacity registration.

JUDSON R. ELSTER, *Secy.*

Buffalo Branch held its regular monthly meeting at the Bailey Bowling Academy, Friday, March 14. A financial statement was given by treasurer Frank Nowakowski.

The outstanding success of our recent joint educational session with Toronto was the subject of much favorable comment. President Joe Ruff, in thanking the committee for their efforts, expressed particular appreciation of the capable way that the program had been prepared by Mr. W. Fotheringham.

Dr. C. J. Wernlund gave a brief talk on the war influence on nickel plating. The exigencies of the defense program has necessarily restricted the amount of nickel anodes, solution, etc., available to manufacturers. Several plating concerns were overcoming this, with excellent results, by using a much heavier copper deposit and a lighter nickel plate. Experiences of the members present were given on this subject and a discussion followed.

RODERICK MCGHEE, *Secy.*

Cincinnati Branch held its regular monthly meeting February 27 at the Hotel Metropole at 8:00 P.M. There were 40 present.

The speaker of the evening was Mr. Ralph Petit of the Aluminum Company of America who had as his topic, "Aluminum and its finishes." Mr. Petit gave the history of aluminum and the process which made possible the recovery of the metal from ore. Several movies and some slides were shown which along with Mr. Petit's fine running description gave the complete story of Aluminum from the mine to the final finishing processes. There

New England
SALES and SERVICE
for the
SOLVENTS
RECOVERY SERVICE, Inc.

Recovery of Solvents and Thinners from Sludge, Waste, Wash, Spoiled Lacquers, etc.
By the

LOFGREN PROCESS

A. B. C. CHEMICAL CO.
Manufacturers' Agent
P. O. Box 16
WATERBURY, CONN.

were displayed at the meeting a large number of aluminum parts finished by the anodic process and showing the variety of colors that can be applied to the metal.

A special meeting was held March 8, to hear Mr. George B. Hogaboom. Mr. Hogaboom's talk was delivered in his usual way of taking each metal and telling of the recent developments in the plating of that particular metal. The part that plating takes in the plans for the National Defense and the problems the plater is called upon to solve were discussed at length.

The members of the branch were well armed with questions when the time came for the question and answer period and Mr. Hogaboom was kept busy answering them until it came time for him to leave. We regret that he could not stay longer with us.

MARTIN M. GANNON, JR., *Secy.*

Providence-Attleboro Branch held its March meeting at the Rhode Island School of Design following a dinner at the Narragansett Hotel. The speaker of the evening was Mr. R. H. McCahan of duPont who spoke on "Recent Developments in Brass Plating." The advantages to be obtained from the use of the new duPont High Speed Brass Process were outlined and the characteristics of the bath given in detail. Considerable discussion ensued between users and prospective users of the process.

Mr. McCahan also presented a very interesting duPont movie entitled "A New World Through Chemistry."

ROBERT D. MACLACHLAN, *Secy.*

Lancaster Branch was indeed fortunate to obtain the services of Mr. Charles Lankau of the Egyptian Lacquer Manufacturing Company for the March 14 meeting, thanks to our

HAMMOND of KALAMAZOO

RITE-SPEED POLISHERS

Single or Variable Speeds – 1 to 50 H.P.
A Model for Every Application.

HAMMOND AUTOMATICS
(Rotary and Strait Line)

High Production and High Quality Finish, Polishing or Buffing, are possible on HAMMOND Automatics. We build a complete line.
Send samples for prices and approximate production figures.

Hammond Machinery Builders INCORPORATED
KALAMAZOO, MICHIGAN, U.S.A.

Eastern Branch — 71 W. 23rd St., N.Y.C.

good supporter Art Snow. The meeting was attended by 36 members and guests. Mr. Lankau very capably discussed the manufacture and derivation of the various lacquers. The properties, applications and various tests were also outlined. The various ingredients of lacquers such as nitrocellulose, shellacs, resins, plasticizers, synthetic resins were described and the properties and applications of these component materials were listed.

The processes of manufacturing were given and the speaker pointed out the necessity for careful handling to prevent fires and also contamination of the lacquers. Laboratory tests and controls were listed and it was very easily seen that high quality materials are produced only under very rigid conditions of manufacture. Following the lecture a very lively discussion ensured.

Mr. Gebert, our Chairman, announced the selection of Mr. Schwalm as chairman of the exhibit committee for the National Convention.

The first annual Stag party of the Lancaster Branch was held on March 21 at Redmens Hall. 36 members and guests enjoyed an evening of fellowship and fun. The usual refreshments were served which added considerably to the interest in the bowling matches.

The highlight of the evening was a bowling match between the York County and Lancaster County groups, the challenge being issued by the losers from York County. The match was very close.

The entertainment committee worked hard to make this affair a success and those present voiced a desire to have another similar function in the near future.

HARRY L. HOVIS, *Secy.*

Newark Branch held its regular meeting on March 7 at the Club Room of the Hotel Douglas, Newark, N. J. Meeting was called to order at 8:30 P.M. with President William T. Maguire presiding. Other officers present were George Wagner, Sec'y-Treas.; Louis Donroe, Librarian; Horace H. Smith and Paul A. Oldam, Board of Managers.

Mr. Horace Smith reported further progress on our coming banquet.

Mr. Louis Donroe presented the guest speaker for the evening, Mr. Nathaniel Promisel. His subject was

Besplate
NICKEL ANODES
AND
McGEAN CHEMICALS
for Better Nickel Deposits and Greatest Satisfaction
USED BY THE LEADERS IN THE INDUSTRY
THE McGEAN CHEMICAL COMPANY
CLEVELAND, OHIO

"Silver Plating Practice." Mr. Promisel gave a very interesting talk on silver plating various metals including Stainless Steel. On the blackboard he wrote formulas for Potassium and Sodium Salts baths and explained in detail the advantages of the Potassium bath over the Sodium bath. At the conclusion of his talk he was asked numerous questions which created a general discussion.

GEORGE WAGNER, *Secy.*

Detroit Branch. The March meeting was another in the successful 1940-41 season. Mr. R. W. Wagner, of Guide Lamp Division, General Motors Corporation, was the speaker of the evening, and 175 members and guests came out to hear his talk on the "National Defense and the Electroplating Industry."

As the defense program has put most of the electroplaters' materials on the priority list, substitutions are necessary. These substitute products should have as good a corrosion resistance as the original material.

The Round Table Question Box had Messrs. Wagner, Amundsen, Hahn and W. M. Phillips, Sr., to answer all the questions fired at them by the members.

Our next meeting is on April fourth, when Dr. Chas. L. Faust of the Batelle Memorial Institute will be the guest speaker.

WRIGHT WILSON, *Secy.*

Detroit Branch of the American Electroplaters' Society continued its "Information Please" Question Box at the meeting held on March 7. The Board of Advisors consisted of Mr. Paul Amundsen, Mr. Edgar A. Hahn, and Mr. Wm. M. Phillips as well as Mr. R. M. Wagner who was also the speaker of the evening.

The Question Box

Q. What are the best methods of preventing drag-out losses from plating solutions?

A. Fume hoods should be used over solutions which liberate considerable spray during their operation; drag-out tanks for the first rinse after plating, the contents of which should be pumped back into the plating tank to replace evaporation losses; spray with a thin mist of water over the plating tank as the work is removed or blow compressed air onto the work to force the plating solution back into the tank.

The position of racking the work, keeping the racks free from pockets

"AHCO"
GRINDING COMPOUND

Saves up to 50% of the time required for barrel grinding of small parts, producing a better surface for subsequent burnishing than can be obtained from the usual methods of wet grinding.

Ahco Burnishing Compounds produce a high lustre in a minimum of time.

Write for complete information.

APOTHECARIES HALL COMPANY
Est. 1849 WATERBURY, CONN.

which might trap solution, and increasing the drainage time over the plating tank are all helpful.

Q. What materials may be safely used as insoluble anodes in bright nickel solutions?

A. It is doubtful if any insoluble anode material can safely be used in bright nickel solutions because most of the addition agents are rather easily decomposed by chlorine which would be liberated at such an anode.

When plating white or dull nickel, in the absence of addition agents, any conductor which would not disintegrate might be used and nickel carbonate added to maintain the nickel content and control the pH. Probably the effect of carbon dioxide in the solution could not be completely disregarded.

Q. How may plating racks which go through both the nickel and chromium plating operations be neutralized to prevent contamination of cleaners and nickel solution on the next cycle of operations?

A. Chromium plated parts and racks may go through an alkaline dip before unracking. If the racks alone are to be treated, an acid solution of ferrous sulphate will reduce the hexavalent chromium to trivalent thereby rendering it harmless. If a reverse current cleaner is used in a cycle, the racks should be stripped in a caustic solution to prevent contamination of the cleaner with chromium.

Q. How can one best obtain information on the processes for anodizing aluminum?

A. The process using sulphuric acid is controlled by the Aluminum Company of America which furnishes technical information to its licensees.

The U. S. Navy Department has printed specifications for anodizing which give quite complete instructions for the operation of the chromic acid process and are available to individuals doing aircraft work, etc.

Q. When zinc plating is carried out with insoluble anodes, using zinc oxide to replenish the zinc content of the solution, what may be done with the excess caustic formed by the solution of the zinc oxide?

A. It is true that if a given weight of zinc oxide is dissolved in a solution of sodium cyanide and caustic soda, an approximately equal weight of caustic soda is formed in the solution. However, since hydroxyl ions (OH^-) are discharged at the insoluble anode and in slightly greater equivalent quan-

MAGNUS PRODUCTS
Tested and Proven for the Plater's Needs in
PRE-CLEANING POLISHING
CLEANING FINISHING
MAGNUS CHEMICAL COMPANY
41 South Avenue Garwood, N. J.
Magnus CLEANERS

tity than zinc is deposited on the cathode, this addition of caustic soda only replaces the alkalinity lost from the solution by electrolysis. This has been tested in the laboratory on a small scale and has proved to work out as described.

Q. Has anyone had any experience with Dirigold as an undercoating for a chromium deposit?

A. No positive answer was received to this question. The general feeling of the group was, however, that this deposit would have no appreciable advantages over a deposit of pure copper for this purpose.

Q. What is the relative availability of lead as compared with zinc for casting articles to be subsequently electroplated or painted?

A. The lead supply is much more adequate for present demands than is the zinc supply. However, if all castings now being made from zinc were to be cast from lead, it is doubtful that the supply would be sufficient. Pure lead castings are too soft to be very useful but lead antimony alloys are fairly hard and strong. Plating on lead alloys presents its problems but they are not insurmountable and it is not impossible that lead may replace zinc for certain types of cast articles.

R. B. SALTONSTALL, *Librarian*

Grand Rapids Branch held its regular meeting March 13 in the Spanish Room of the Rowe Hotel which was attended by an overflow of members and guests. Mr. Maurice Caldwell, President, opened the meeting at the usual hour promptly. All business matters were discussed and approved and ten new members were elected.

Reports were given by Mr. Sperry, chairman of the display for the coming Convention, and it was decided that the parts that were on display for last year's convention should be used again this year with some additions and changes which could be made on the panel board.

Mr. Caldwell appointed Mr. Chester Smith as Chairman and instructed him to appoint assistants to work with our local Bureau on methods and procedure of advertising and promoting this Branch's work in conducting the coming Convention in 1942. Data and literature from the Cleveland Branch were given him showing that Cleveland is now pulling strongly for the 1942 Convention.

Some discussion took place as to changing the meeting place of this Branch. Two applications were received to be considered by the Board for election in the April 10th meeting.

Mr. Kennedy of the E. I. du Pont de Nemours & Company gave a short talk on High Speed Brass Plating. Sound moving pictures were then given showing "A New World Through Chemistry," after which another round table discussion took place, and questions on plating were asked by the members and answers and discussions took place.

C. E. ABEL, *Secy.*

Every BUFF Made to Your Order
Deliveries on Schedule
MIDWEST BUFFS
USE MIDWEST
E. 79th ST. & PLATT AVE. CLEVELAND OHIO

Los Angeles Branch. The second and final Membership Drive Meeting of the 1940-1941 Membership Campaign was called to order. An announcement was made that hereafter all those who attend the regular meetings are entitled to free auto parking through the courtesy of the Hotel Rosslyn.

The applications of 24 applicants were read and the applicants were voted in and initiated. The new members were welcomed into the Branch by Frank Rushton.

The meeting was turned over to the Librarian, E. Holman and a sound picture, "Through the Alchemist's Hour Glass" was shown by the Norton Abrasives Company.

The following questions were found in the question box.

Q. How can I stop my copper solution from plating brass instead of copper?

A. Carefully add 1/64 oz. hypo. per gal. of solution. If this does not improve results dump solution and start over again.

Q. A strip solution for stripping nickel from diecasting only strips the work near the top and not the work at the bottom of the solution. Why? The solution, 5 parts H_2SO_4, 2 parts HNO_3, 2 parts H_2O, 1/16 part HCl.

A. No one present has had any experience with this type of strip. A 50 Be. H_2SO_4 solution with 1 qt. glycerine per 100 gals. operated with reverse current is recommended.

Q. Will stripping copper in a chrome plating solution hurt the solution?

A. It's best to keep all impurities out of all plating solutions. Copper in a chrome plating solution will soften the deposit, increase trivalent chrome, and decrease conductivity.

Q. What pickle other than HNO_3 can be used to remove the heat scale from welded steel tubing?

A. 10% H_2SO_4 at 180° F. Then clean smudge in a solution of 5 oz. Cn. and 1 oz. NaCl. per gal. cold, reverse current.

Q. How can rust be removed from steel parts that have some portions chrome plated without injuring the chrome?

A. 10% H_2SO_4 with inhibitor, or 10 oz. Cn. per gal. at 120° F.

ERVIN FRAUENHOFF, *Secy.*

Newark Branch A.E.S. held its regular meeting on Friday evening, March 21, 1941 at the Hotel Douglas, Newark, N. J., President William T. Maguire presiding.

Mr. Horace H. Smith and Mr. Louis Donroe reported further progress on the coming banquet. Mr. George Wagner stated that Franklyn J. MacStoker had asked him to convey to Newark Branch members the sincere thanks of New York Branch for the support given them at their annual.

Mr. Louis Donroe presented the guest speaker for the evening, Mr. Louis W. Reinken of the W. Green Electric Company, New York. His subject was "Rectifiers for Electro-

CONTROL YOUR PLATING SOLUTIONS
KOCOUR TEST SETS
KOCOUR CO. • 4725 S. CHRISTIANA AVE. • CHICAGO

plating." Mr. Reinken told us how rectifiers were first discovered; what compositions they were made of; how they were assembled and how they were gradually taking the place of the Motor Generator Set in the Electroplating industry. He illustrated on a blackboard how multiple units could be connected so that you can get anywhere from 6 to 60 Volts or from 100 to 1000 Amperes out of the same unit. Mr. Reinken exhibited a stack of a Selenium Type Plate Rectifier. He claimed that this type rectifier was superior, in his estimation, to any other rectifier on the market. He was asked numerous questions and answered all questions to everyone's satisfaction.

GEORGE WAGNER, *Secy.*

Baltimore-Washington Branch. The April meeting of the branch was an open meeting held at Bilger's Restaurant in Baltimore on Saturday April 5. Thirty-five members and guests enjoyed the dinner and the program that followed. To expedite matters, President Hahn streamlined the business session. Three new applications for membership were received. We may get out of the red yet on the membership campaign. For a Nominating Committee, President Hahn named Tom Slattery, Sam Warnock, and Arthur Pierdon, also designating Warnock as chairman for the Picnic Committee. With the Exhibits Committee to take care of too, we think Sam should have been named George. The Baltimore people voted for more meetings in Baltimore, and the excellent arrangements made by Mr. Huston and others for this meeting lent weight to their argument.

For the educational session, Librarian Brenner gave us Mr. George B. Hogaboom in "Information Please." Few men would dare face a quiz calling for such wide and specialized information, and it is more than doubtful that anyone could handle it as George does.

C. T. THOMAS, *Secy.*

YOU SHOULD USE

Zialite

Reg. U.S. Pat. Off.

Nickel Plating Solution

1. If you plate ZINC or ALUMINUM DIE CASTINGS.
2. If you wish to cover complicated shapes.
3. If you plate articles made of several pieces soldered together and want to cover the solder.

ONE bath for ALL types of WORK or METALS

STAN-O-LEAD

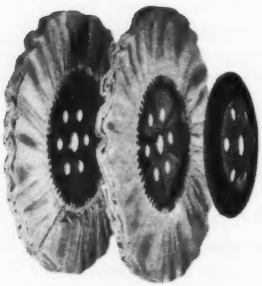
A new bath plating a tin-lead alloy.
Corrosion resistant.
Ideal for parts which must be soldered.
100% current efficiency.

ZIALITE CORPORATION
143 Exchange Street
WORCESTER, MASS.

Newark Branch held a meeting April 4 at the Club Room of the Hotel Douglas, Newark, N. J. The meeting was called to order at 8:30 P. M. with President William T. Maguire presiding.

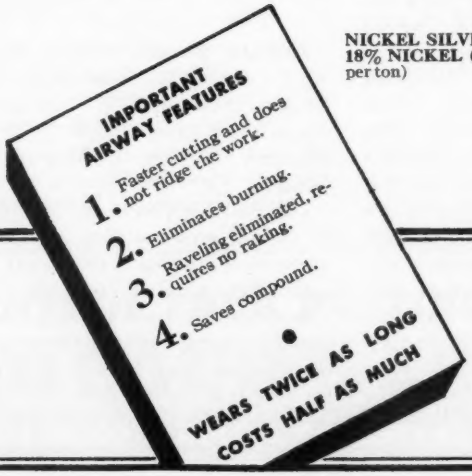
Our Banquet Chairman, Mr. Horace H. Smith, reported that all arrangements were practically completed. He urged the members to make their reservations at least two days in advance to enable the committee to give the necessary guarantee to the Hotel. He next stated that the Ladies Auxiliary was doing all in their power to make the afternoon party, which they

BE WISE... ECONOMIZE



No matter how much you complain you can't save on the price of metals. You'll pay. You'll like it? Here are some comparative prices.

	Monthly Averages Aug. 1940	Feb. 1941
CADMIUM (platers' price per ton)	**$1700.00**	**$1745.46**
ZINC (consumers' price per ton in carlots)	**127.78**	**145.00**
COPPER (consumers' price per ton in carlots)	**214.16**	**235.88**
LEAD (consumers' price per ton in carlots)	**97.08**	**112.04**
	Aug. 15, 1940	Feb. 15, 1941
NICKEL SILVER SHEET, 18% NICKEL (price per ton)	**$592.40**	**$615.00**


IMPORTANT
AIRWAY FEATURES
1. Faster cutting and does not ridge the work.
2. Eliminates burning.
3. Raveling eliminated, requires no raking.
4. Saves compound.
WEARS TWICE AS LONG
COSTS HALF AS MUCH

WARNING NOTICE

Jackson Buff Corporation of Long Island City, New York, has rights to U. S. Patents Nos. Re 19,894 and 2,140,208 which have broad claims covering an air cooled buff having means for the admission of air through the sides of the buff. Owner intends to protect all rights and stop infringement.

USE AIRWAY *Ventilated* BUFFS AND SAVE 50%

If you don't think 50c on each dollar is worth saving you probably won't be in business when present conditions change. Don't be a doubter. It's too expensive. Compare performance of Airway with the buff you are now using. Write us.

ON YOUR COTTON BUFF WHEEL COSTS

JACKSON BUFF CORPORATION

21-03 41st AVENUE LONG ISLAND CITY, N.Y.

are arranging for the out-of-town ladies as well as the wives of Newark Branch members, a huge success.

The Board of Managers reported that they had held a meeting and discussed the proposal of Milwaukee Branch to admit student members to the Society at a reduced rate. A motion that this proposal be rejected and that the delegates be instructed to vote against it at the Convention was voted on and carried.

The question of Per Capita Tax was next brought up for discussion. All the members agreed that 45% for Per Capita Tax was too high and way out of proportion as compared to other organizations. The question of raising the dues was also brought up but 95% of the members were against this measure.

Mr. Smith reported that the Second Vice-President, Mr. Nelson Sievering, had informed him that he did not wish to go any further in the Supreme Society. He then proposed Mr. George Wagner an eligible candidate and made a motion that the delegates be instructed to nominate him at the National Convention in Boston. This motion was carried by unanimous vote.

Mr. Louis Donroe conducted a Question Box. Some of the problems discussed were anodizing aluminum, nickel plating aluminum, copper plating and oxidizing aluminum, and electro-polishing carbon steel.

GEORGE WAGNER, *Secy.*

New York Branch held two scheduled meetings during the month of March, at their headquarters in the Conference Rooms of the Hotel Pennsylvania, New York City. The March 14 meeting was a business meeting followed by a Round-Table discussion on current plating problems of the membership, led by the Librarian, Edwin C. Rinker, and supplemented by suggestions and recommendations of the Methods Committee of Lionel Cinamon, Henry Levine, Martin Maher and Harold Lang.

The meeting on March 28 provided the monthly educational feature, a talk on "Modern Gold Plating" by Joseph B. Kushner, consultant chemical engineer. Mr. Kushner's extensive ex-

With PERMAG

Cleaning Compounds

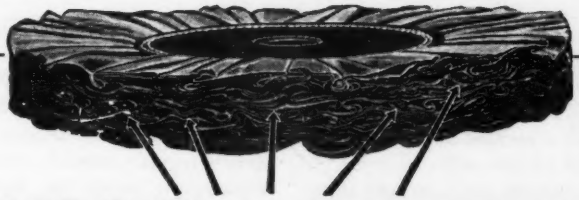
Metals that have been almost impossible to clean by generally accepted ways have been cleaned 100 per cent by PERMAG. If you have a tough cleaning job, write us about it.

PERMAG is low in cost.

MAGNUSON PRODUCTS CORPORATION

Main Office and Factory, Third & Hoyt Sts., Brooklyn, N. Y.

Representatives, from Coast to Coast. Warehouses in Principal Cities.
In Canada: Canadian Permag Products, Ltd., Montreal and Toronto.



A BIAS BUFF DEVELOPMENT

A few years ago industry was offered a buff made by us, that would do better work with fewer sections and also save compound. This buff was well received, and put to work; it meant lower costs on finishing. This buff is known as the OVERLAP PLY and is widely used today. It is made of cloth from our own mills, and is a special BIAS construction—there are no buffs like it! The BIAS Mark is plainly stamped on the side.

See that the BIAS MARK is on the Buffs you buy

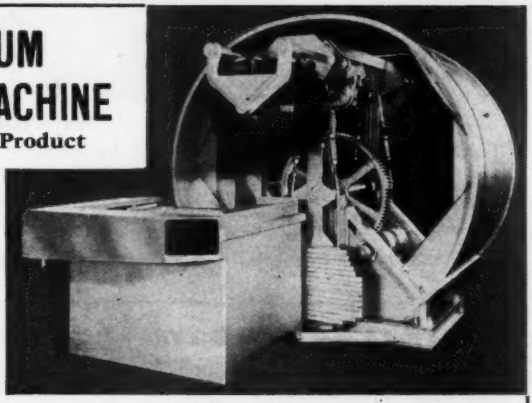
We have customers who will use no other buff. We invite you to try a few, and prove our claims. We also make Bias Ventilated Buffs.

WARNING NOTICE. Manufacturers of buffs are warned against infringement of the claims of this U. S. Patent 2,004,623, as the owner intends to protect his right and prevent all infringement.

The BIAS BUFF *and* WHEEL CO., Inc.
430 Communipaw Ave. Jersey City, N. J.

TWIN DRUM TUMBLING MACHINE

A New *Metalwash* Product



Specially designed motorized machine for tumbling metal parts in TWIN DRUMS.

These drums are loaded at floor level, then quickly lifted, and are revolved in hot soap solution tanks.

Drums are then brought to a convenient position for automatic discharge or refilling.

This machine is representative of the specialized jobs with which our engineers are often confronted.

If you have a problem at your plant that calls for skilled experienced engineering and expert mechanical construction we cordially invite an interview. Write us.

METALWASH MACHINERY COMPANY, Inc.

27-29 Haynes Ave. Newark, N. J.

We now manufacture Cleaning and Drying Equipment for arsenals and for firms engaged in National Defense Work.

perience in the precious metals field gives him an admirable background from which to draw facts and, further, to explain their correlation to an interested and expectant audience. Mr. Kushner did his job well.

There were four elections and three applications filed at these meetings.

FRANKLYN MACSTOKER, *Secy.*

Pittsburgh Branch. The regular meeting was held April 3 at the University Club. This meeting was a social one to which we invited the ladies. We had the largest attendance of the year except for the Banquet and Educational Session held in March.

Mr. Ted Hayward, chief chemist of the Natrona Works of Pennsylvania Salt Company presented a half hour entertainment of chemical magic. Mr. Saylor of our Branch offered several violin solos. Moving pictures and refreshments completed the evening's entertainment.

Our next meeting will be held May first at the University Club at which time Dr. Blum will speak.

FRANK KELLER, *Secy.*

Toledo Branch held its regular monthly meeting in room 224 of the Macomber high school, March 6. There was a lengthy discussion concerning a joint banquet after which Mr. Ward Hunlock was appointed to go to Dayton to attend a meeting in that respect. Mr. Paul Dressel was appointed alternate.

A motion by Mr. Weiker, that the branch regular monthly meeting and educational session be held in the laboratory of the Macomber high school, and that all social meetings be held on some other night than the regular meeting night, was passed.

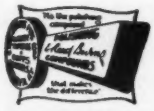
Mr. May introduced the speaker of the evening, Mr. E. C. Rinker, who is connected with the technical laboratories of the Oakite Products, Inc., New York. Mr. Rinker addressed us on the subject, "Metal Cleaning before Electroplating," He also had tables and pictures to show how different cleaning materials would work on different oils, grease, dirt, etc. The talk was very interesting. Mr. Rinker very capably answered many questions asked by interested members. We sincerely hope that we may have the pleasure of having Mr. Rinker with us again.

GASTON BERGEMAN, *Secy.*

Waterbury Branch held its regular meeting March 14 in the Colonial Room at the Hotel Elton. Twenty-nine sat down to dinner preceding the meeting. Earl Ball won the drawing for the free dinner.

In 1941 — we have the answers!

Whether your buffing and polishing work is on non-ferrous metals — on the newer stainless alloys — plastics — or die castings; in the jewelry — national defense — industrial — or usual consumer product field, depend upon and come to REEDBURNS for practical recommendations that will help you to get better finishes faster and at lower costs.

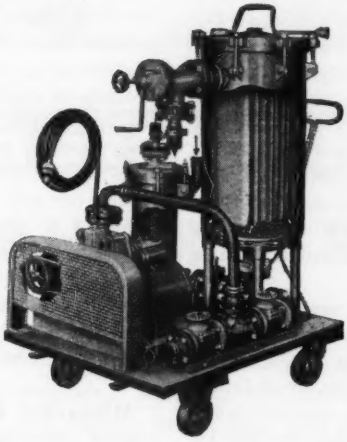


Makers since 1888 of
BUFFS — COMPOUNDS — WHEELS

E. REED BURNS MANUFACTURING CORPORATION 41 WITHERS STREET BROOKLYN, N. Y.

FILTERS for

- *Bright Nickel*
- *Nickel*
- *Chrome*
- *Copper Sulphate*
- *Brass*
- *Cyanide Copper*
- *Brite Zinc*
- *Silver*
- *Electrocolor*
- *And Others*



PERFECT CLARIFICATION — Complete removal of all undissolved impurities — Guaranteed.

RAPID ACTION — Large filtering area and high pressure pumps facilitate high flow rates and long filter cycles.

CLOSED FILTRATION — Filter plates locked in leak proof chamber — "no leaking" — and "no loss of solution."

INTERCHANGEABLE — Both acid and alkaline solutions can be filtered with the same filter, by interchanging filter plates.

LARGE FILTER CHAMBER — Affords greater sludge holding capacity, making ideal system for removal of carbon or lime from treated solutions in process of eliminating iron, organic matter, oil, etc.

LOW OPERATING COST — Sturdy construction and simplicity of operation makes cost of filtration negligible.

PORTABLE — Units can be easily moved from tank to tank.

Write for New Bulletin: "Filtering & Purifying Electroplating Solution"

INDUSTRIAL FILTER & PUMP MFG. CO.

3017 WEST CARROLL AVENUE CHICAGO, ILLINOIS

The meeting was opened promptly at 8:00 P. M. by President Candee, sixty-one being present. The applications for membership from Richard W. Goss, E. A. Sesselmann, Isadore Himmel, Willis Yarnall, Edmund Knill, and Frederick W. Swalwell were read.

W. L. Cassell reported on progress being made in the collection of samples for the Boston exhibit. Twenty-two firms are expected to exhibit.

Comparing our conditions with those under which the Electro-depositors Technical Society now operates, Ellsworth Candee read portions of a bulletin received from the English Society. Meetings are held during the daytime so members may get home before dark, and excellent air raid shelters are provided at the Northampton Polytechnic Institute so that the gatherings may be held in comparative safety. Quite a contrast to our good dinners and comfortable, well-lighted meeting places.

The next business meeting will be held at the home of S. L. Henn in Cheshire on March 26.

George Dubpernell reviewed briefly two inexpensive books on electroplating. The first, published by the International Text Book Company in 1936, costs one dollar. It is written by J. B. Alfriend, Jr., contains a brief discussion of the various plating baths, and appears to be largely an abstract of Blum and Hogaboom. The second book published in 1937 by the Popular Science Publishing Company is entitled "Electroplating," is comprehensive, and sells for two dollars.

Technical Chairman John Carr introduced Ralph E. Pettit of the Aluminum Company of America. Mr. Pettit traced the history of aluminum from its earliest production in 1852 to the present time. He described in detail the finishing of this metal, showing samples of products obtained by anodizing and dyeing. The talk was well illustrated by a sound motion picture showing the mining and purification of the ore and the production of the metal.

Ray O'Connor told us of the preparations being made for the Regional Meeting to be held May third, at the Stratfield Hotel in Bridgeport.

SPENCER L. HENN, *Secy.*

Milwaukee Branch. At its 318th regular meeting, Milwaukee Branch

CEILCOTE . . .

Acid-proof Lining for Pickling Tanks, Pits, Drains, Floors, Basins, Foundations.

COMPO-BOND . . .

Acid-proof Mortar for Bonding Brick and Tile. Sets by Chemical Action.

CEIL-POR . . .

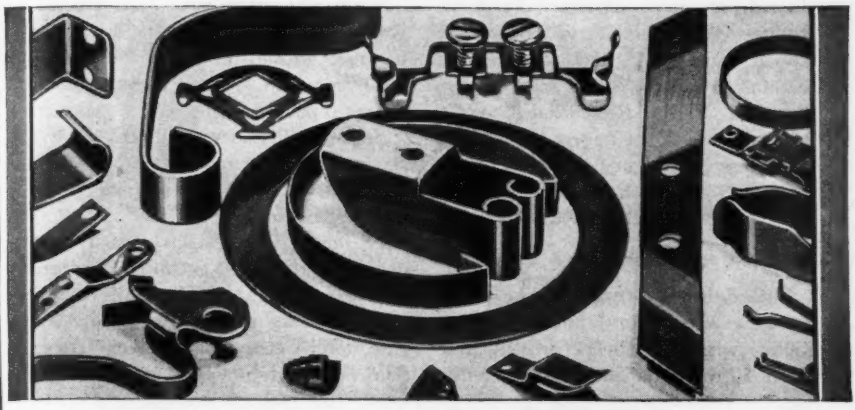
A 100% Bakelite Coating. Unequalled for protection of Bonderizing or Processing Tanks. Lengthens the life of any surface—Wood, Metal, Cement, Brick, Composition, Linoleum, Stone, Rubber, Concrete, Canvas.

Ceilcote Brush Coating . . .

A Standard of Protection against corrosion, electrolysis, acids, alkali, fumes, gases, vapors and all weather conditions.

THE CEILCOTE COMPANY

750 ROCKEFELLER BLDG. CLEVELAND, OHIO



SEYMOUR

PHOSPHOR BRONZE

AN alloy which has carved a bright niche for itself in many fields. It is highly resistant to corrosion, fatigue and abrasion. Excellent for the manufacture of flat and wire springs that must give reliable, uninterrupted service under adverse conditions. It offers no fire risk from sparks when struck or from "arcing" when electrically charged, and is practically indifferent to thermal change.

May be had in sheet, wire and rod, from soft to spring hardness or leaded for free turning. Samples and catalog on request.

THE SEYMOUR MFG. CO., 52 FRANKLIN ST., SEYMOUR, CONN.

elected its new officers: president, Rodney Olsen, Racine; vice-president, Robert Steurnagel, Jr., Milwaukee; secretary-treasurer, Dexter Rhodes; librarian, Philip Ritzenthaler, West Allis; board of managers, Albert J. Hermansen, William Geissman, James Poulson.

DEXTER F. RHODES, *Secy.*

Philadelphia Branch. The meeting was called to order by President Keller, with all officers present and about 50 members and guests attending.

Librarian Zurbach introduced Dr. Walter R. Meyer, Editor of *Metal Industry*, who spoke on "Recent Developments in Electroplating." Dr. Meyer's talk was well received and was followed by quite a discussion.

Four new members were elected. Reports of the exhibits committee, banquet and membership committees were received. The banquet committee reported a substantial profit.

Supreme President Fulforth gave a short talk on the activities of the office as well as a brief account of his trip to the west coast.

President Keller asked for a brief discussion of how to get more members out to meetings, which finally ended by appointing a committee to investigate hotels, etc., where we may have dinner or refreshments after the meetings. Any suggestions members can give will be appreciated.

A motion was carried that "As nominations will be opened again this month all present officers be re-nominated for election."

J. W. HIMES, *Secy.*

Third Annual Meeting of NEW ENGLAND BRANCHES

American Electroplaters' Society

Bridgeport · Hartford · New Haven · Springfield · Waterbury

At the Stratfield Hotel, Bridgeport

Educational Program

Technical Chairman, *Wm. J. Gray*, Waterbury

Speakers:

1. *Dr. Samuel Glasstone*, Frick Laboratory, Princeton University, Princeton, N. J. Subject: "Some Problems of Electrolysis."

Symposium on Conservation of Metals by Electroplating.

2. *Dr. Louis Weisberg*, Consulting Chemical Engineer, New York. Subject: "Bright Copper Plating for the Relief of Nickel Plating."

3. *Dr. Hubbell*, Singmaster & Breyer, New York. Subject: "Zinc Plating Direct from the Ore Rather Than from Anodes."

4. *Morris Stone*, United Engineering & Foundry Co., Pittsburgh, Pa. Subject: "Electro-Tin Plating from the Ore."

Time: Saturday, May 3rd, 1941. Educational Session to start at 2:15 P. M. Dinner at 7:00 P. M. Tickets $2.50.

Joseph G. Sterling, Secy.

DON'T YOU HEAR THAT WHISTLE...

BLOWIN'?

The chances are, if you're in the metal finishing department you *don't* hear the five o'clock whistle. If you hear it, you probably don't heed it. Metal finishers don't work by the clock. They work by the job.

We know this because for more than thirty-three years we have been working with metal finishers, helping them to clean metal prior to painting, plating, lacquering, enameling... prior to almost any finish metal will take.

Wyandotte Service Represenatives bring the combined experience of the entire Wyandotte organization to every job they tackle.

There is a trained Wyandotte man ready, and able, to help you — without obligation. Call us today.

THE J. B. FORD SALES CO.

WYANDOTTE · MICHIGAN

Wyandotte PRODUCTS

Service Representatives in 88 Cities

IS THE DAY TOO SHORT?

Save Time By Sending Your Solutions To Us For Analysis. Immediate Accurate Report By Air Mail.

NICKEL SOLUTIONS
Nickel, Chlorides
Boric Acid, pH
COPPER SOLUTIONS
Copper, Free Cyanide
Carbonates, pH
ACID COPPER
Copper, Sulfuric Acid

$1

ROCHELLE COPPER
Copper, Rochelle salts
Free Cyanide,
Carbonate, pH
BRASS SOLUTION
Copper, Zinc, pH
Free Cyanide,
Carbonate

$1.50

Other Solutions & Other Ingredients At Equally Low Prices
Send a 4 oz. Bottle by Parcel Post or Prepaid Express

KOCOUR CO.

4724 S. CHRISTIANA AVE. • CHICAGO

★ ★ ★ **SPECIALISTS IN SOLUTION CONTROL** ★ ★ ★

Springfield Branch. The regular meeting was held at the Hotel Charles on March 24 at 8:00 P.M. The meeting was called to order by President Costigan. The following members were appointed to the nominating committee: Mr. Art Logozzo, Chairman, and Messrs. Art Copp and Walter Barrus. The committee will present their nominations for officers at the April meeting.

Mr. I. D. Niles, chairman of the Exhibits Committee, reported that the following companies have agreed to prepare exhibits for the National Convention: General Electric's Plastics Division, Westinghouse Electric & Mfg. Co., Anderson and Sons, National Blank Book Co., and The Monsanto Chemical Co.

President Costigan introduced Mr. E. T. Candee, Technical Supervisor of the American Metal Hose Branch of the American Brass Co., Waterbury, Conn. who showed an interesting motion picture entitled "From Mine to Consumer." This movie showed how copper ore is mined, refined, and fabricated into rods, sheets, and billots. Mr. Candee explained other sources of copper and their particular methods of refining. D. S. HARTSHORN, JR., *Secy.*

PROPOSED RESOLUTION

Milwaukee Branch has drawn up the following resolution to be presented at the Boston Convention in June:

"Whereas, the American Electroplaters' Society is a society organized for the purpose of advancing the science of electroplating and

Whereas, it is desirable to have closer connections with various educational institutions throughout the country because of the impetus it would give research on metal finishing problems and

Whereas, it is desirable that the American Electroplaters' Society have as members all who are interested in plating and

Whereas, most scientific organizations have special student memberships, therefore be it

Resolved, that the American Electroplaters' Society create a special class of student membership which would permit university students, both graduate and undergraduate to become members at a reduced rate." (Signed) DEXTER F. RHODES

Secretary, Milwaukee Branch

AMENDMENT TO CREATE BRANCH SECOND VICE PRESIDENTS

We submit the following amendments to the Constitution and By-Laws:

CONSTITUTION

Part II. Branch Societies. ARTICLE III. Officers.

Sect. 1. following "a President, a Vice President," to add "*and a Second Vice President.*"

BY-LAWS

Part II. Branch Societies. ARTICLE II. Duties of Officers.

Sect. 2. Vice President: to add to this section, "*He shall be Chairman of the Membership Committee.*"

To add after section 2, the following new section: "*Sect.* 2A. *Second Vice President: It shall be the duty of the Second Vice President to perform the duties of the President, or Vice President, in the absence of either or both, and shall be chairman of the Exhibits Committee.*

The idea behind these suggested amendments is to coordinate the work of the branches and dove-tail into sections 7 and 9 of the "Supreme" part of the Constitution.

Under Section 8 of the Supreme part of the Constitution, the Branch Librarian would coordinate with whatever Supreme Vice President had charge of the Educational Work. (Signed) ERVIN FRAUENHOFF

Secretary, Los Angeles Branch

Used Buffs for Sale

64-68—1⅛" arbor—20 ply

Full Disc - Loose - or Sewed

Thousands of every size

8"—8¢ each 9"—9¢ each

10"—12¢ each

MICHIGAN BUFF CO., INC.

4054 Beaufait Ave. Detroit, Mich.

Divine COMPRESS

POLISHING WHEELS

Finer finishes— at lower cost

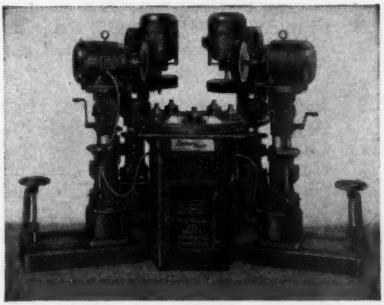
Divine Brothers Company

62 Whitesboro St., UTICA, N. Y.

Quality Products Since 1892

ODD SHAPES ARE EASY, TOO!

on PACKER-MATIC



On a PACKER-MATIC they're easy—automatically rotating on their own centers, volume parts of "odd shapes" are buffed and polished at an enormous saving in time and finishing cost.

There's a Type of PACKER-MATIC for your difficult-to-finish Part. SEND PART and get a "Time Study." WRITE Dept. E.

AUTOMATIC POLISHING & BUFFING MACHINES

Packer-Matic

THE PACKER MACHINE CO., MERIDEN, CONN., U. S. A.

Membership Report

ELLSWORTH T. CANDEE, *Chairman, Membership Committee*

To April 1, 1941

ELECTIONS

Baltimore-Washington Branch

Kenneth M. Huston, 3208 Tyndale Ave., Baltimore, Md. Active

Bridgeport Branch

I. Albert Lee, General Electric Co., Bridgeport, Conn. Associate
James Ward Cassel, Electrolux Corp., Old Greenwich, Conn. Active
Clarence J. Washing, Wiretex Mfg. Co., Mason St., Bridgeport, Conn. Assoc.
Frank W. Rock, 379 Carroll Ave., Bridgeport, Conn. Associate
Orville Waring Mellick, University Club, Bridgeport, Conn. Associate

Chicago Branch

William T. Kosobud, Jr., 2208 S. Millard Ave., Chicago, Ill. Associate
Louis Madenberg, 4017 N. Central Park Ave., Chicago, Ill. Associate
Frank Overholt, 4321 Jackson Blvd., Chicago, Ill. Associate
Walter A. Warner, 2134 Point St., Chicago, Ill. Associate
Lou H. Moulton, 4856 S. Halsted St., Chicago, Ill. Associate

Cincinnati Branch

Frank B. Schmerge, 649 W. 12th Street, Covington, Ky. Associate

Cleveland Branch

Philip Brotzman, R. F. D. #3, Geneva, Ohio. Active
George P. Kregelius, 2976 E. 81st Street, Cleveland, Ohio. Associate
Frank Roy, 4480 Clague Rd., Olmstead Falls, Ohio.
J. L. Stonebrenner, 5318 St. Clair Ave., Cleveland, Ohio. Associate

Detroit Branch

Jack E. Keyes, 58 Brighton, Highland Park, Mich. Associate
Reginald J. Crane, 48 Oakdale Blvd., Pleasant Ridge, Royal Oak, Mich. Associate
Charles W. Dodd, 10-255 General Motors Bldg., Detroit, Mich. Associate
Hermon P. Wright, 1662 Lafayette, Detroit, Mich. Active
Elmer J. Paddock, 2832 E. Grand Blvd., Detroit, Mich. Associate
John J. McMahon, 14917 Aubrey, Brightmoor Sta., Detroit, Mich. Active
Lee E. Sherrod, 205 W. Dartmouth St., Flint, Mich. Associate

Grand Rapids Branch

Eugene P. Bottje, 523 Webster St., Traverse City, Mich. Associate
Christian M. Fernekes, 2020 College, S.E., Grand Rapids, Mich. Associate
Eric L. Johnson, % Muskegon Aluminum Foundry, Muskegon, Mich. Active
Esra L. Klaiber, 135 Houseman, N. E., Grand Rapids, Mich. Associate
Andrew W. Liger, 433 Clancy, N. E., Grand Rapids, Mich. Associate
Joseph C. Lombardo, % Harshaw Chemical Co., 134 Granville, S. W., Grand Rapids, Mich. Associate
Anthony Preston, 915 Davis Ave., Grand Rapids, Mich. Active
Julius H. Rohdy, Parts Mfg. Co., Traverse City, Mich. Honorary
Robert V. Twyning, 1150 Dunham St., S. E., Grand Rapids, Mich. Associate
Edward J. Vogt, 493½ Upton Ave., Battle Creek, Mich. Active

Lancaster Branch

Clair Cooke, The McKay Co., York, Pa. Active
John Mace, 247 N. George St., York, Pa. Active

Membership Campaign

BRANCH	May 1, 1940	Change in Membership	Percent Change
1 Los Angeles	59	+55	+93.2
2 Lancaster	25	+17½	+70
3 Grand Rapids	52	+19	+36.6
4 Springfield	51	+15	+29.0
5 Montreal	23	+6	+26.1
6 Dayton	62	+14½	+23.4
7 Rochester	62	+14½	+23.4
8 Boston	79	+17½	+22.1
9 Cincinnati	39	+8½	+21.7
10 Waterbury	66	+14	+21.2
11 Cleveland	70	+14½	+20.9
12 San Francisco	20	+3	+15.0
13 Philadelphia	133	+19½	+14.6
14 New York	102	+14	+13.7
15 Toledo	40	+5½	+13.7
16 Anderson	38	+4	+10.5
17 Newark	125	+10	+8.0
18 Pittsburgh	34	+2½	+7.3
19 Milwaukee	84	+6	+7.1
20 Detroit	250	+16	+6.4
21 Hartford	45	+2	+4.4
22 Bridgeport	71	+2½	+3.5
23 Chicago	225	+4½	+2 0
24 Bing.-Syracuse	22	0	0
25 St. Louis	77	—1	—1.3
26 Prov.-Attleboro	38	—1	—2.6
27 New Haven	119	—6	—5.0
28 Toronto	67	—4½	—6.7
29 Baltimore-Wash.	49	—4½	—9.2
30 Buffalo	57	—13	—22.8

MEMBERSHIP — May 1st, 1940 = 2183
MEMBERSHIP — April 1st, 1941 = 2470
GAIN = 13.2%

NOTE: Honorary members are included with each Branch.

Los Angeles Branch

Robert C. Berry, 4417 E. 3d St., Los Angeles, Cal. Associate
William C. Brockus, 1222 E. 77 Pl., Los Angeles, Cal. Active
Harry W. Callas, 146 E. 87 St., Los Angeles, Cal. Active
Hubert C. Cariker, 4315 S. Hoover St., Los Angeles, Cal. Associate
Mabry C. Courtney, 637 E. 83 St., Los Angeles, Cal. Active
Leslie C. Crewse, 1041 W. 101 St., Los Angeles, Cal. Active
Eugene O. Foster, 551 E. Stepney St., Inglewood, Cal. Active
Jack A. Frost, Apt. 409, 538 S. Fremont St., Los Angeles, Cal. Active
Richard A. Henderson, 1800 S. Bronson, Los Angeles, Cal. Associate
Fred A. Herr, 322 S. Flower St., Los Angeles, Cal. Associate
Raymond Hinkle, 3151 W. 134th Pl., Hawthorne, Cal. Active
Albert M. Hyde, 221 N. Ditman, Los Angeles, Cal. Active
Oscar Johnson, 631 S. San Pedro St., Los Angeles, Cal. Active
Frank S. Jurkosky, 1015 S. Vancouver Ave., East Los Angeles, Cal. Active
John W. Kewak, 919¾ Leighton Ave., Los Angeles, Cal. Associate
Earl Loesh, 822 S. Fir St., Inglewood, Cal. Active
Harold E. Moyer, 4324 S. Normandie, Los Angeles, Cal. Associate
Mac T. Munnell, 617 Hoefner Ave., Los Angeles, Cal. Active
Rudolph Munoz, 3031 Malabar St., Los Angeles, Cal. Active
James Petrovics, 222 E. 79 St., Los Angeles, Cal. Associate
Elmer G. Richardson, 3875 W. 132 St., Hawthorne, Cal. Active
Richard K. Sollivan, 9015 Hubbard St., Culver City, Cal. Associate
Vincent Stabile, 226 E. 80 St., Los Angeles, Cal. Associate

Milwaukee Branch

Leslie E. Montanye, Parker Pen Co., Janesville, Wis. Active

Newark Branch

Joseph W. Fasano, Curtiss Propellor Div., Newark, N. J. Associate
John Miller, Harry Schick Co., 105 Chestnut St., Newark, N. J. Active
Victor Trovato, 299 Tenth Ave., Paterson, N. J. Associate
John W. Varick, 20 High St., Glen Ridge, N. J. Associate

New York Branch

John G. Martini, 1315 Avenue R., Brooklyn, N. Y. Active
William M. Vella, 32 Brinkerhoff St., Ridgefield Park, N. J. Associate
Gerald T. D'Agostino, 421 Lafayette Ave., Brooklyn, N. Y. Active

Philadelphia Branch

George A. Gibbs, Keystone Watch Case Corp., Riverside, N. J. Associate
George Vernon Haas, Acme Plating Co., 703 Walnut St., Phila., Pa. Active
Ellwood R. Lanahan, 3344 N. 10th St., Philadelphia, Pa. Active
Fred Rinteln, 5651 Rosehill St., Philadelphia, Pa. Associate
George C. Rossberg, 911 S. Conestoga St., Philadelphia, Pa. Active
Erwin V. D. Wallace, 15 Valley St., South Orange, N. J. Associate

Rochester Branch

Allen W. House, 184 Depew St., Rochester, N. Y. Associate
Wellington V. Smith, 61 Fairgate St., Rochester, N. Y. Associate
Willard Yorkey, 88 Bond St., Rochester, N. Y. Associate
John C. Hudgins, 399 Woodbine Ave., Rochester, N. Y. Active
John W. Callaghan, 114 Ardmore St., Rochester, N. Y. Active

St. Louis Branch

L. A. Horowit, 1357 Temple Pl., St. Louis, Mo.

Springfield Branch

J. F. Buckman, 442 Elm St., New Haven, Conn. Associate
Edwin Jarm, 425 Rogers Ave., West Springfield, Mass.
George J. Juke, 37 Moorland St., Feeding Hills, Mass. Associate

IT'S LIKE A BABY . . .

IT WETS EASILY

(*but not the way you think*)

Darco S-51 — the activated carbon specially made for purifying electroplating solutions — never forms a fluffy, dry blanket on the surface when being made into a slurry. It wets easily. And quickly! No bother — no discomfort or inconvenience!

And once in the solution, Darco* S-51 quickly adsorbs grease, oil, soaps, and troublesome disintegration products — the "ghosts" that often spoil a plating job.

If you're not already using Darco S-51, write for a sample. Or, order a supply from your jobber. A little over a dime buys enough to keep 100 gallons of solution clean for a week!

*Darco Reg. U. S. Pat. Off.

DARCO

This trademark identifies the genuine. Accept no packages without it.

D A R C O
CORPORATION
60 East 42nd St.
New York, N.Y.

New York Branch

Joseph F. Brust, 119 Walton St., Brooklyn, N. Y. Associate
Alexander M. Kohn, 2186 E. 19th St., Brooklyn, N. Y. Active
Leonard A. Kornblum, 325 E. 59th St., Brooklyn, N. Y. Associate

Pittsburgh Branch

Damon C. Antel, 742 Fifth Ave., Coraopolis, Pa. Associate
A. B. Davenport, Jr., Vandergrift Bldg., Pittsburgh, Pa. Associate
Richard Rimbach, 1117 Wolfendale St., Pittsburgh, Pa. Associate
Wm. A. Rogers, 721 Highland Bldg., Pittsburgh, Pa. Associate

St. Louis Branch

N. S. Knierim, 3825a Humphrey Ave., St. Louis, Mo.

Toronto Branch

A. C. West, 353 Indian Grove, Toronto, Ont. Associate
J. J. Fitzsimmons, 152 Glenmount Park Rd., Toronto, Ont. Associate
S. Whittaker, 40 Goldwin Ave., Mt. Dennis, Ont. Associate

Waterbury Branch

Richard W. Goss, % Scovill Mfg. Co., Waterbury, Conn. Associate
Isidore Himmel, 1409 Dixwell Ave., Hamden, Conn. Associate
E. A. Sesselman, 50 Tracy Ave., Waterbury, Conn. Associate
William Macristy, Maple Hill Ave., New Britain, Conn. Associate
Edwin A. Maker, % Benrus Mfg. Co., Cherry Ave., Waterbury, Conn. Active

REINSTATEMENTS

Edward Nolde, 23 Dunn Ave., Naugatuck, Conn., Active, Waterbury Branch
George Christensen, 2532 E. 53 St., Los Angeles, Cal. Active, Los Angeles Branch
Jack Feldman, 82 Rockaway Parkway, Brooklyn, N. Y. Active, New York Branch
Richard M. Quinn, 111-28 207th St., St. Albans, N. Y. Active, New York Branch
L. H. Seabright, 119 N. Parkside Ave., Chicago, Ill., Associate, Chicago Branch
Alex Piscator, 3357 W. 59th Pl., Chicago, Ill., Active, Chicago Branch

TRANSFERS

W. R. Binai, from Anderson to Indianapolis Branch
Earle Esner, from Anderson to Indianapolis Branch
Lawrence A. Meyer, from Binghamton-Syracuse to Springfield Branch
Arthur Zavarella, from Providence to Springfield Branch

SUSPENSIONS

Marshall Prescott, Bridgeport Branch
W. S. Schwartz, St. Louis Branch
(The inclusion of George Bignall's name in the suspensions list in March was an error.)

RESIGNATIONS

R. J. Amberg, Detroit Branch
J. H. Collins, Toronto Branch
M. R. Thompson, Baltimore-Washington Branch

DEATHS

M. A. McDonald, 153 Willow Ave., Sherrill, N. Y. Rochester Branch